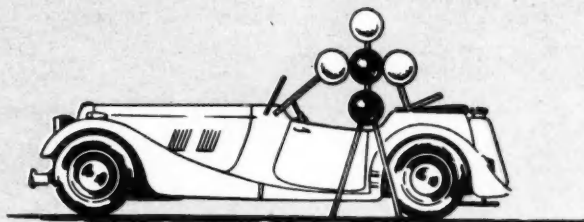


Chemical Age

**CHEMICAL
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(page 831)

VOL. 77 No. 1975

18 May 1957



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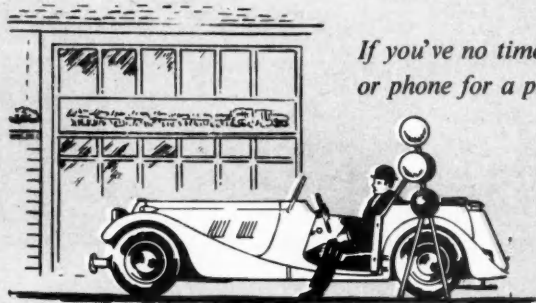
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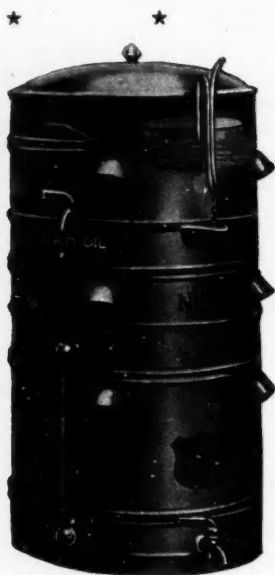
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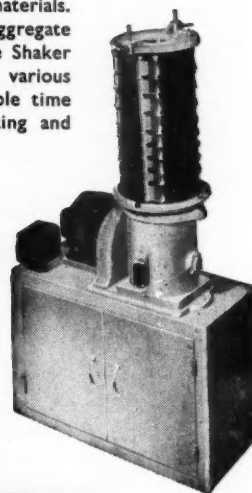
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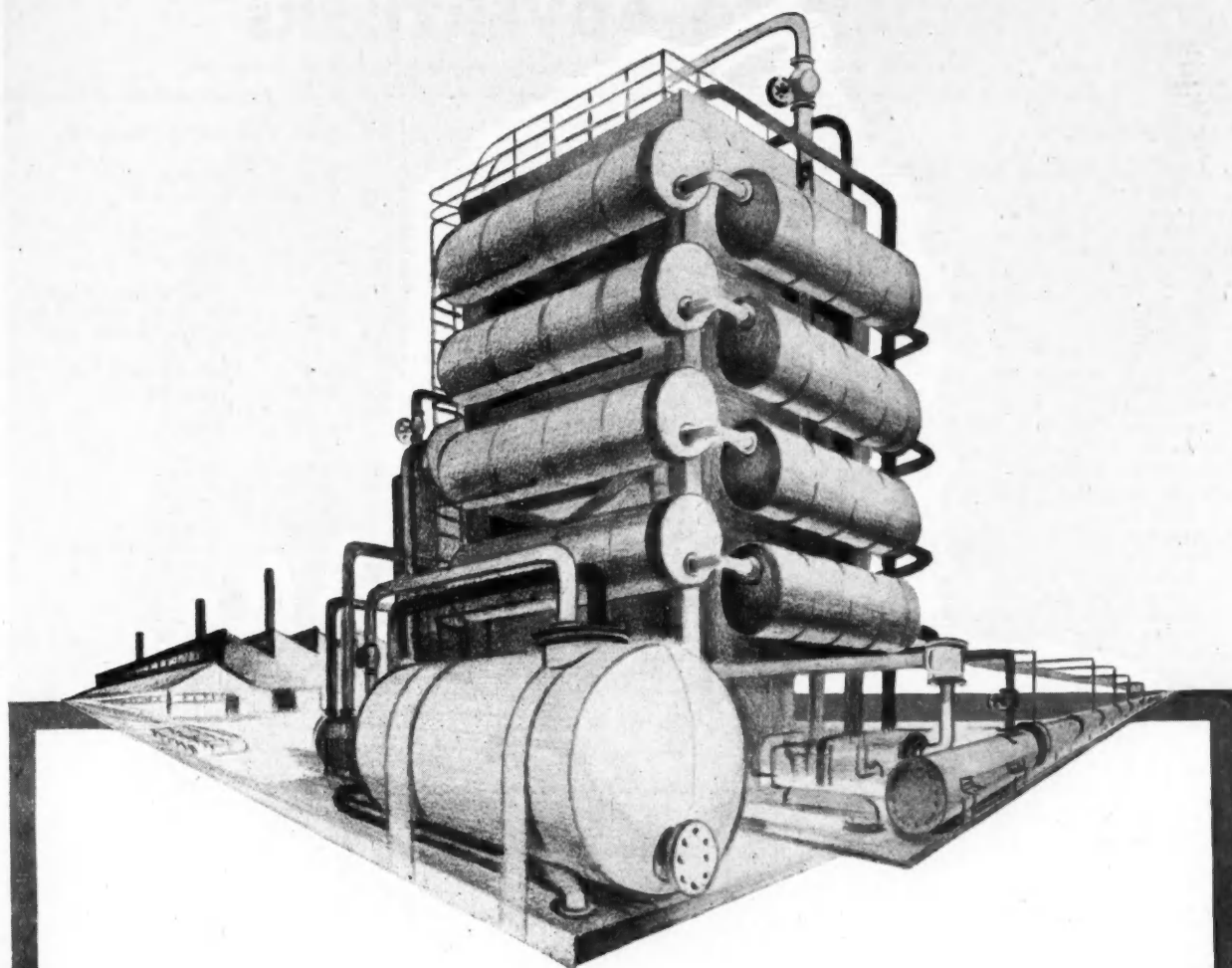
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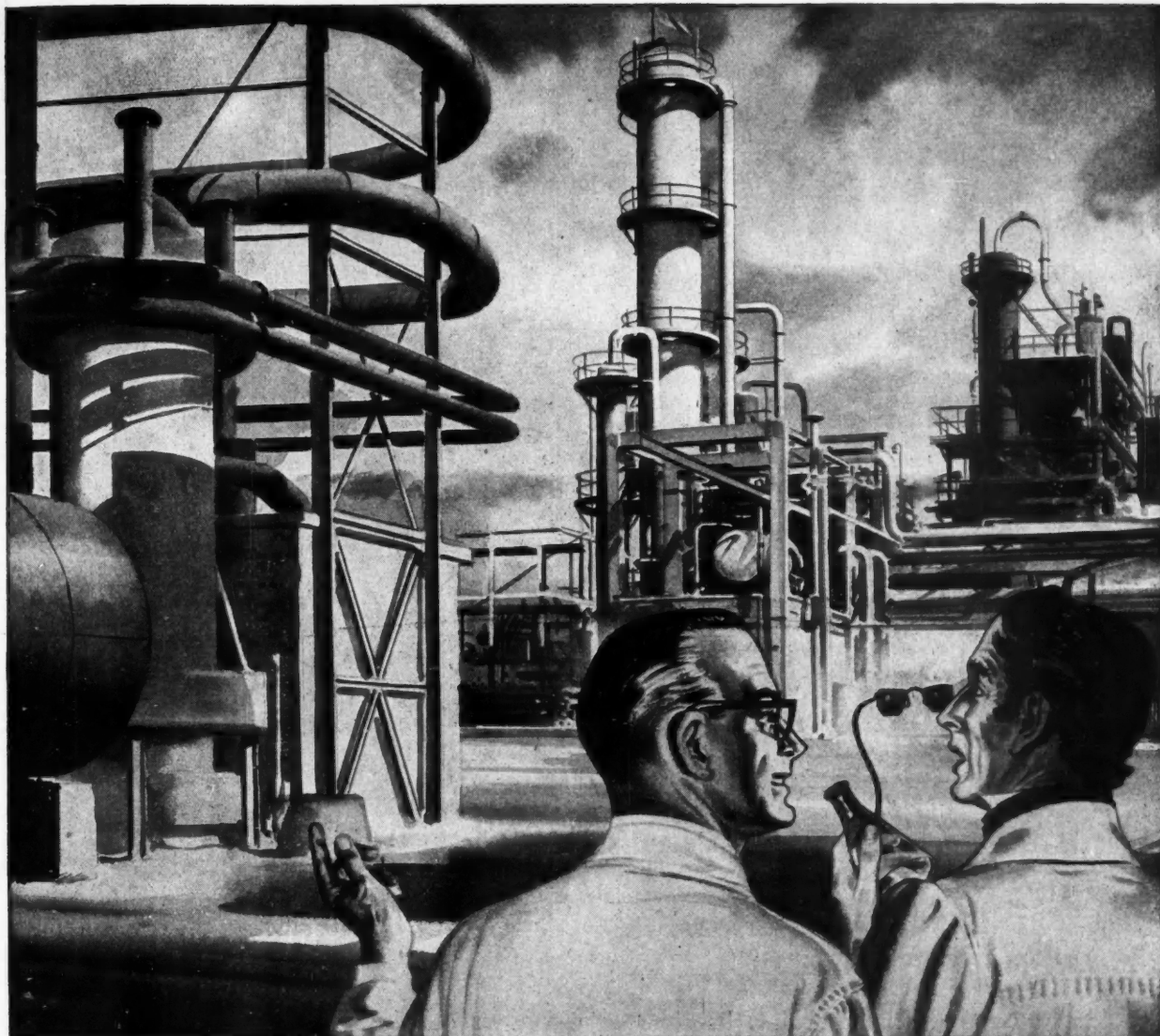
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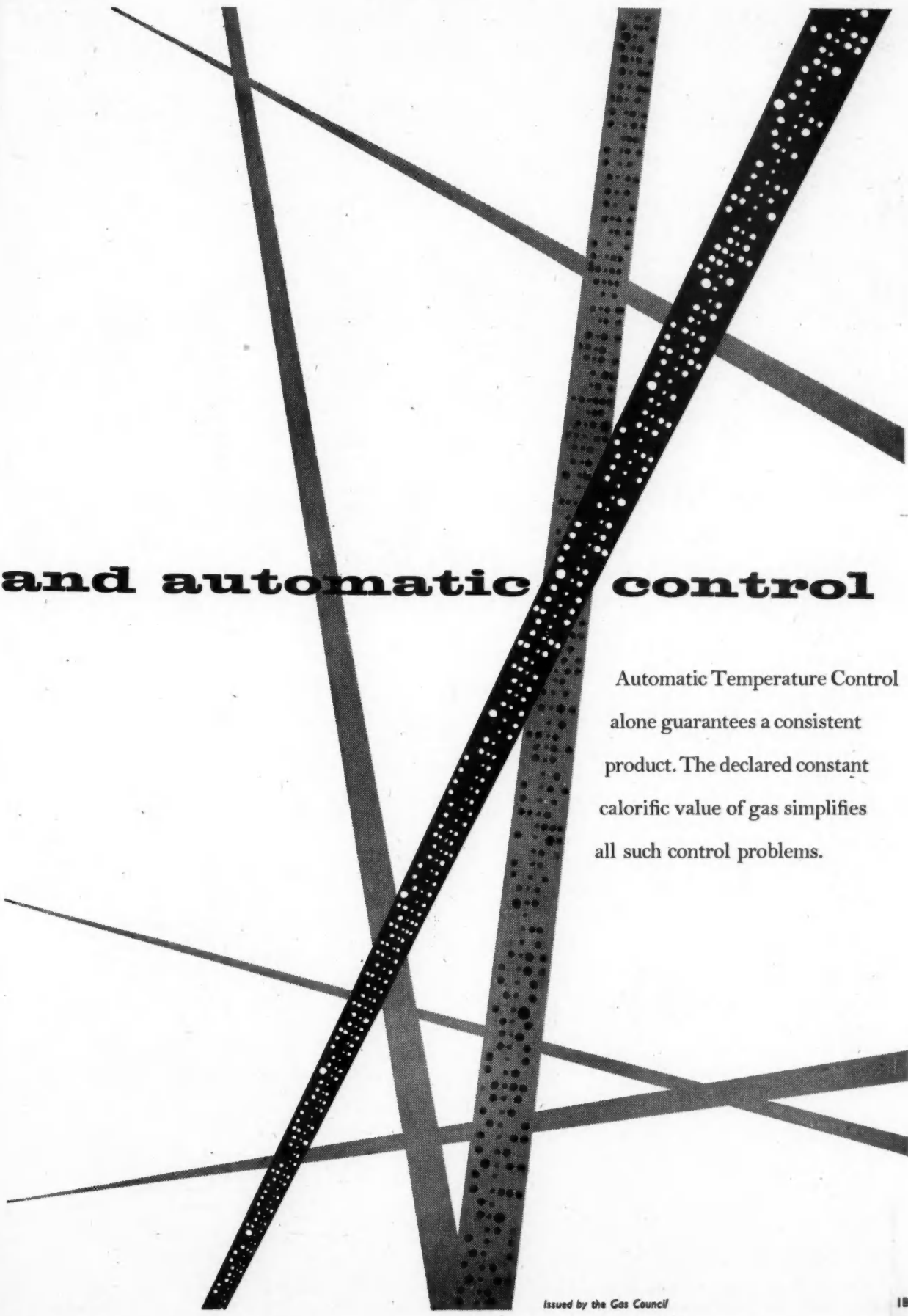
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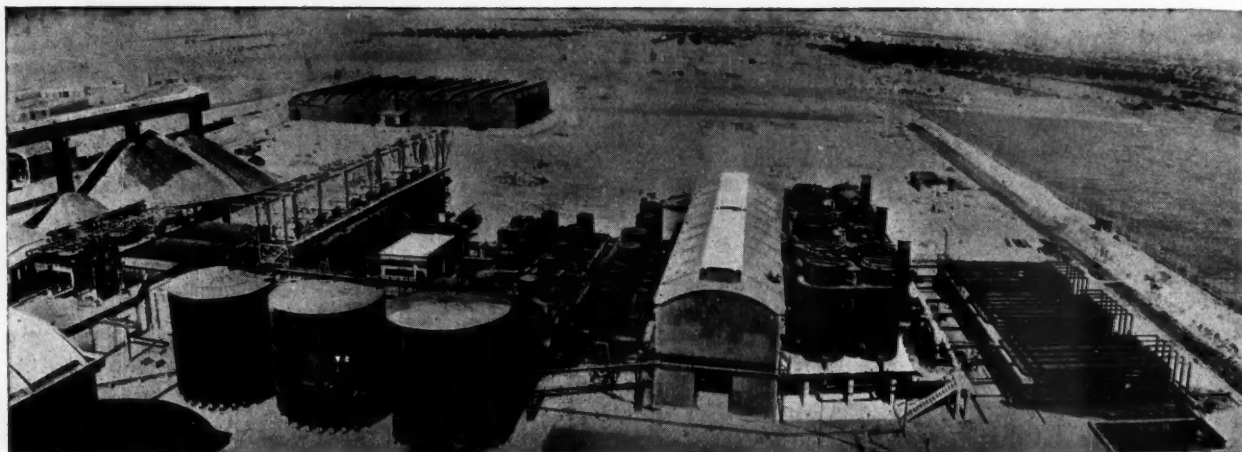
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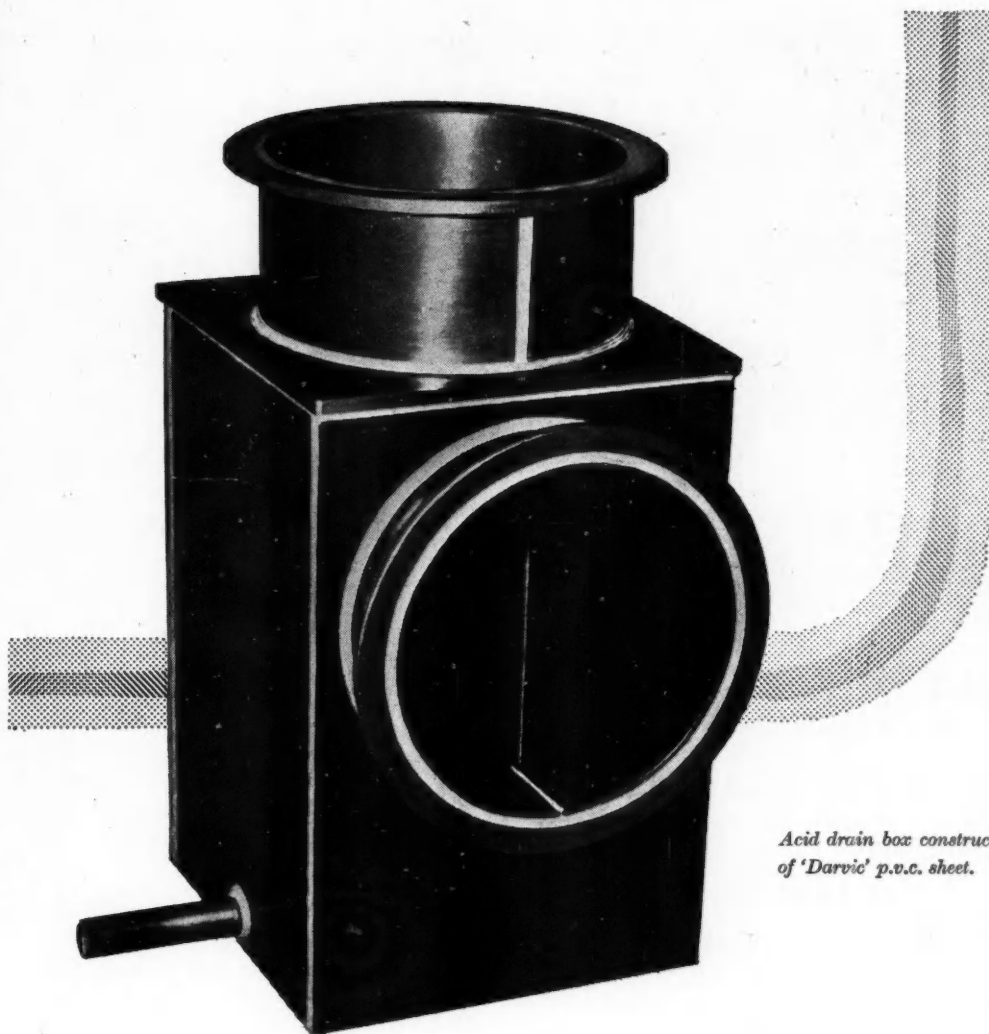
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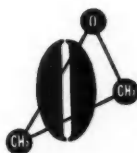
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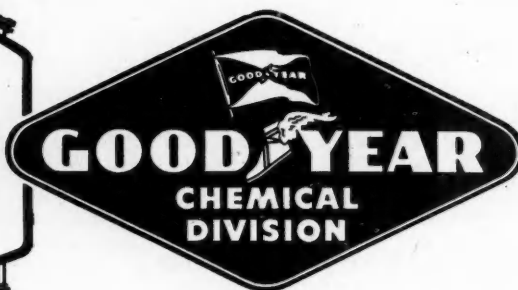
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VOL. 77

No. 1975

18 MAY 1957

Telephone: FLEet Street 3212 (26 lines)

Telegrams: Allangas . Fleet . London

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CHEMICAL AGE

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'SINEWS OF RESEARCH'

IT IS NOW abundantly clear that if it is to be successful, industrial research must be promoted on a large scale. In addition, research must be continuous. That being so, it would seem that only the largest companies are likely to be in a position to benefit from the application of science to industry.

Nothing could be farther from the truth. Apart from the research laboratories set up by large-scale concerns, British industry also has behind it a system of collective research organisations that is second to none in the world. There are now few industries, large or small, that do not have the support of a research association.

Whether they make the best possible use of those facilities is another matter. Clearly in the case of certain sections of the food manufacturing industry, there is a lamentable lack of appreciation of the important part that science has to play. That much was obvious from the results of a survey (reported in our last issue, page 798) which indicated that some 1,700 firms seemed unaware of the existence of their research organisation.

Yet it is difficult to believe that all these firms employ no scientist on their staff. If a company has only one chemist, then he is failing in his duty if he does not take note of the work of his own particular research organisation.

Some first principles concerning the vital relationship between industry and research were touched on at the opening of Fison's new research station at Levington last week and reported in page 849 of this issue. Sir Alexander Todd pointed out that some firms did not get any practical results from the work of their RAs. Inevitably that was because they employed no chemists and therefore had no means of appreciating or applying the advantages of research.

But, of course, even the small firm, provided it employs a trained man, can derive immense benefit from the work of an industrial RA. It has behind it the resources of what are usually a fully qualified scientific staff and substantial laboratories. That is how the small firm is able to take advantage of new techniques that might otherwise only be made available to the larger companies with their own well-equipped laboratories.

Sir Clavering Fison referred to the approach to research of the large organisation. For that type of concern, it was not possible to rely on a policy of making use of scientific and development work done by other organisations. He also made the point that unless a firm had itself undertaken research work it was not likely to be in a position to apply the work of others.

Despite the great expansion in this country's industrial research facilities in the past 10 years, the pure scientist on leaving university is still inclined to view this field of endeavour with suspicion. As Lord Heyworth, Unilever chairman, said at the recent annual meeting of his company, the young science graduate imagines that initiative and creative genius will be put in fetters, and that industrial research is inhabited by hard-faced business men who have done well out of exploiting scientists and that the whole level of activity will be intellectually lower than in Government or university research.

Although, for the sake of argument he was overstating the case, there is no doubt that such feelings do sway the decisions of some science graduates. But industrial research has nothing to be ashamed of. Its position is now firmly

established and it has contributed handsomely to the national economy. In fact, any increase in the prosperity of this country depends on what Lord Heyworth calls the 'sinews of research'.

CHEMICAL RESEARCH 1956

THE REPORT of the director of the Chemical Research Laboratory for 1956, which is reviewed on page 835, indicates the progress made during the year by the six main research groups—namely, corrosion of metals, inorganic, organic, radiochemical, high polymers, and microbiological.

The board state that the report particularly remarks certain interesting developments in the researches being carried out in the laboratory and gives some indication of their practical value. Unfortunately, however, the report is not drawn up clearly enough to indicate these interesting developments.

That industry is obviously interested in the laboratory's work can be observed from the fact that more than half the visitors (1,271) at the open days came from industry (641). The director in his report also notes that the laboratory has received many visitors for discussions of problems with the staff and it is estimated that approximately 10 per cent of staff time, particularly that of senior officers is occupied by this necessary and useful duty.

What type of problems have been discussed with the laboratory? It appears that many enquiries relate to immersed corrosion and the action of hot waters in boilers, in washing equipment and evaporators in feed pipes etc. Corrosion testing methods have also been discussed with enquirers.

The laboratory is devoting as much attention as possible to fundamental research on corrosion as the development of preventive measure depends so much on knowledge of corrosion mechanism. The laboratory realises though that close co-operation should be maintained with industry, with public authorities and with other organisations.

There is a suggestion in the corrosion of metals group report that while interesting enquiries on corrosion prob-

lems were received, many of these could have been avoided. Lack of care and supervision were often responsible for corrosion.

On the subject of trade wastes, the report is sadly lacking although this is perhaps explained by the statement that 'not many samples are interesting.' Four samples a month have been received. Of flue dusts received, four were found to contain germanium (see *CHEMICAL AGE*, 11 May, page 797).

Two problems only on air pollution are being studied although daily and monthly observations are being carried out on behalf of the Fuel Research Station. It is assumed that the laboratory's investigations here will be reported in due course by the Fuel Research Station and/or the Committee on Air Pollution.

Investigations by the high polymer group have now largely been concentrated on studies of the structure and permeability of polymer films and fractionation of polymers and molecular weight distributions. Some basic studies of the ion-exchange and allied properties of cross-linked polymers are being continued on a small scale.

Perhaps the most interesting information contained in the report is that work in the polymer group is to be concentrated on the preparation of new and improved ion-selective membranes suitable for use in dialysis. This is due to the current interest in the application of multi-compartment electrodialytic cells to the purification of brackish waters, the treatment of industrial effluents and related problems. So important is this work judged to be that DSIR and the National Research Development Corporation have agreed to sponsor a scheme of research and development in this field, and additional staff has been recruited to carry out the programme.

PROGRESS AT DOUNREAY

ACTIVITY at Dounreay for the past year has been mainly confined to constructional work on the two reactors—the fast breeder reactor and the materials-testing reactor—and on fuel element manufacturing and process lines which are to serve two reactors. Considerable building work has gone on to provide laboratories and offices for staff. The steel sphere which forms such a prominent landmark on the station has been complete for some time.

The materials-testing reactor, DMTR, which is built on much the same lines as DIDO, is expected to undergo criticality trials in the early autumn. Fabrication of DMTR fuel elements is now being carried out using enriched uranium. Towards the end of the year, the processing plant for the fuel elements is scheduled to begin operations (see page 831).

The two reactors are designed to provide criticality and radiation facilities for much of the research and development group. Immediate investigations of the group concern the critical concentrations of the various fissile materials when moderated by various materials in vessels of differing shape. This series of experiments will, it is hoped, produce empirical results which will allow theoretical treatment of the problems.

Processing of nuclear fuels is an essential aspect of a nuclear power programme and, of course, the economics

of the separation of the fuels has a considerable bearing on the ultimate cost per kW.

As well as recovery of plutonium and uranium, fission products must be extracted in a form which allows easy storage, with concentration by direct evaporation or separation of the most useful long lived radio-isotopes.

Of significance is the irradiation time for a fuel element for lengthy irradiation of natural uranium fuel produces elements containing a fair amount of U237 which gives rises to shielding problems in later stages of the process. Therefore the aim is to achieve a high degree of separation of the fission products in the first stage, so that subsequent stages only require light shielding. Criticality is the main problem in the subsequent stages.

In the report on the Dounreay atomic power station, the various extraction processes are described and also the basic operations for decanning the fuel elements followed by extraction of components and purification. Storage of highly active wastes and disposal of the lightly active wastes are also considered.

The work at Dounreay suggests that versatility in processing plants is necessary for the time being, for neither reactor nor fuel elements have yet been standardised.

According to authorities such as Nicholls and Spence of AERE, Harwell, solvent-extraction is considered to provide the best compromise at the present stage of development.



This general view of the Dounreay works shows the sphere housing the fast breeder reactor between the central administration building and power house. In the centre is the highly active liquor evaporation building where waste radioactive liquor from the chemical

section is reduced in volume for storage. Left, is the main ventilating shaft of the chemical group, through which is extracted bad air, ensuring that no radioactive material is directed towards workers in the plant

Chemical Operations at Dounreay

THE Dounreay experimental fast breeder station will go into operation next February, at least 12 months ahead of any comparable US fast breeder power plant. As a result of the work being carried out on this reactor furnace Britain will be able to start the construction of full-scale nuclear power stations of this very advanced design by the early 1960's. This is several years earlier than it was thought might be possible.

The purpose of the Dounreay atomic establishment is to investigate the engineering, chemical, irradiation and safety problems of the operation of liquid-cooled thermal reactors and reactors with a 'positive gain-factor' on an industrial scale. From the experimental fast breeder reactor will come the necessary operating experience for commissioning an advance machine and experimental data on the behaviour of fuel elements, cooling systems, and control techniques.

The chemical group at Dounreay is to fabricate fuel elements and will process these after irradiation, not only for the Dounreay materials testing reactor, but also for Dido and Pluto, and British Commonwealth reactors of this type.

Buildings for the chemical group are divided into laboratory, fuel element fabrication and billet production plant buildings, chemical plant buildings and the highly active storage building.

Fuel Element Fabrication: Two distinct processes are carried out in this section. Firstly, enriched uranium metal is made into fuel elements for the fast fission reactor. Secondly, fuel elements for the material testing reactors at Dounreay and Harwell are manufactured from highly enriched uranium.

In the manufacturing operations uranium is alloyed with aluminium in a vacuum furnace and cast into billets, which are then rolled into strip and accurately punched to the required weight and dimensions. After enclosure in an aluminium plate sandwich, they are assembled with channel sections of aluminium, coated with aluminium-silicon alloy and dipped into a flux bath. Careful analytical control is maintained over the composition of the uranium/aluminium alloy and over the dip brazing bath and cleaning solutions.

Fast Reactor Chemical Separation Plant: Irradiated fuel elements embedded in lead inside a stainless steel container are transported from the reactor to the plant in a shielded coffin. The elements are stripped mechanically, leaving bare uranium metal containing plutonium and fission products.

The element pieces are transferred to a steam-heated continuous dissolver and

dissolved in nitric acid. The solution so formed is conditioned to the correct acidity and passed through a sludge remover, continuous sampler and constant volume feeder to the first cycle pulsed mixer-settler extraction unit. The solvent, tri-butyl-phosphate solvent, flows counter-current to the rod solution and preferentially extracts fissile material from the bulk of the fission products which run to the highly active liquor evaporation plant. Uranium and plutonium are then recovered from the solvent by back-washing with nitric acid in another contactor. The back-wash solution is reconditioned and passed through a second and similar cycle.

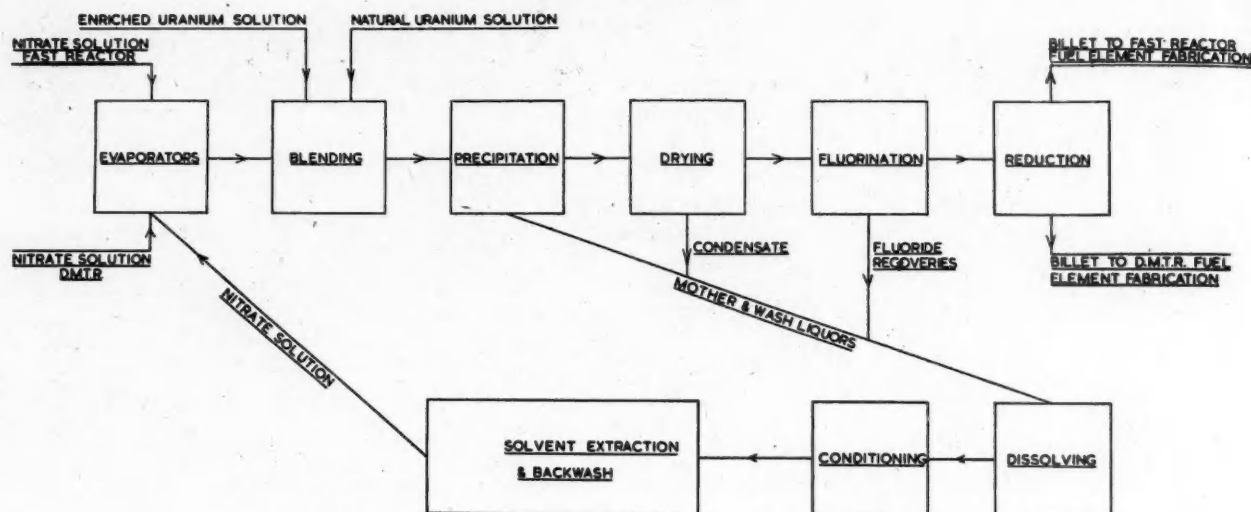
In a third solvent extraction cycle, uranium is separated from plutonium and the purified uranyl nitrate is transferred as required from storage tanks to the metal production plant. The plutonium is subjected to another purification cycle followed by concentration by evaporation and transfer to the Windscale atomic factory, Cumberland, for processing to metal.

Materials Testing Reactor Chemical Separation Plant: In this section a complete reactor charge of irradiated fuel elements in a shielded coffin is received from the reactor. The elements are dropped into a pond of water and the sides milled off separating the individual plates. These plates are charged singly into a dissolver where they are dissolved in nitric acid to give a solution containing aluminium, uranium, a small amount of plutonium and fission products. Aluminium and fission products are removed by solvent extraction. Further purification of the resulting uranium solution is carried out by another solvent extraction cycle which removes the plutonium and any residual fission products.

The pure uranyl nitrate solution is transferred to the metal production plant. The aluminium and fission product solu-



Assembling a fuel element for the materials testing reactor in the element production section. Each plate of the element contains an alloy of enriched uranium and aluminium



Uranium purification (top); metal production and recovery (below)

tions from the first and second purification cycle are sent to the highly active liquor evaporation and storage plant. At all stages, accurate metering and sampling is carried out for fissile material accounting and plant control.

Uranium Metal Production: Uranium is purified and recycled through the reactors by chemical and metallurgical processes carried out by the chemical processing group. Uranium from both Dounreay materials testing reactor (DMTR) and fast reactor are processed separately.

During the various processes impure or unworkable uranium occurs. Special purification and conversion to pure metal are then required. This is carried out in the recoveries section of the metal production building. The uranium solution formed is converted to metal, after blending with the solution received from the chemical separation plant.

Processing Adjustments

During nuclear reaction in the reactors the ratio and total weight of uranium isotopes originally present in the fuel is changed and the solution received at the metal production plant from reactor discharge is not of the correct isotopic concentration for recharging. Processing adjustments are therefore made to ensure that the metal produced will have the correct isotopic enrichment for the reactor requirements.

Chemical Analysis, Control Laboratory: Control of radioactivity is maintained from data provided by the laboratory where samples from the plants are analysed. The results of analysis enable the plant managers to ensure efficient and safe operation of their plants.

The large programme by the research department also needs the services of the control laboratory to indicate the degree of success of experiments. To carry out this work about a hundred chemists and physicists are employed in the control laboratory. Because of the nature of the work handled, new techniques are being developed in the control laboratory itself and old techniques improved.

Effluent Disposal: Fission product solutions arising from the chemical separation

plants and the laboratories are concentrated and stored in the highly active liquor and storage plants. Evaporation has been chosen as the easiest and most convenient method of reducing the bulk of the fission product solutions and thereby conserving expensive storage space.

Two separate pipelines, one taking evaporable liquor, and the other non-evaporable liquor, discharge highly active effluent to the building. Non-evaporable liquor is obtained from the DMTR chemical separation plant waste liquor. This contains sufficient aluminium nitrate to make evaporation inadvisable because of crystallisation dangers. The non-evaporable liquor, therefore, is passed direct to storage.

The evaporable liquor goes to holding tanks in the building from whence it is transferred batchwise to a constant volume feeder in the evaporation cell. Transfer is effected by using vacuum lift technique. The liquor is then fed through a steam strip column, which removes the volatile tri-butyl phosphate and kerosene, and then to a continuous evaporator. The concentrated fission product solution is transferred to storage and the condensate from the evaporation is monitored and discharged to sea.

Vacuum lift techniques are used to carry



Safety foreman, Mr. Leslie Jones, wearing a pressurised protective outfit, inspects apparatus in a highly active analytical cell. Operations in this cell are remote controlled

out liquor transfers in the plant, and steam ejectors are used to provide the vacuum, since the use of mechanical equipment, e.g., pumps and valves, is impracticable because of the radiation hazard involved in their maintenance. For ease of maintenance, the steam ejector is, therefore, outside the biological shield which surrounds all the active section of the plant. Precautions have also been taken in designing the plant to ensure against active vapour or liquid being drawn outside the shield. Flow distributors are used where liquids from various sources have two or more alternative lines of flow.

The concentrated active liquor in storage contains several important isotopes, e.g., Cs^{137} and Sr^{90} , which have industrial and medical applications. Provision has been made in the plant for the withdrawal of liquor from the storage tanks and its transfer to a future extraction plant for isolating and purifying these isotopes.

Each building neutralises its low radioactive liquid effluent before sending it, via a cast-iron drain pipe, to two lined effluent pits, from which the wastes are discharged to the sea. Pumps working one hour after high tide ensure that the effluent is diluted and drawn away from the shore. Representative samples are taken of the liquid as it is being pumped to sea and are analysed at Dounreay. Records of the results are held available for inspection by persons authorised by the Secretary of State for Scotland.

Gaseous Effluent

Gaseous effluents produced are radioactive gases—iodine 131, xenon and krypton, non-radioactive gases—nitrous fumes, and radioactive particulate matter—uranium oxide and fluoride. The gaseous effluent system and control is designed to deal with all these types of effluent in such a manner, that the quantity and rate of discharge can cause no ill-effects in the surrounding areas.

Krypton and xenon are produced as fission products and their decay products during radioactive cooling of the irradiated fuel elements. They include radioactive and stable isotopes such as krypton 85 and 86 and xenon 133, 135 and 136. The half-life of the radioactive members is such,

however, that after the cooling period, the quantity released is within stipulated limits.

All vessels where nitrous fumes are evolved from a radioactive solution, present a possible hazard in the form of entrained radioactive liquor, in addition to the oxides of nitrogen. These vessels are, therefore, vented through water scrubbing towers, where the nitrous fumes are dissolved and any entrained radioactive liquor is removed, insoluble inactive gases only being discharged to the atmosphere.

Uranium oxide and fluoride are handled in dry powder form. They are beta active and have long half-lives. Because of the danger of discharge of particulate matter, all gaseous effluents originating from these materials are filtered through special resin-treated merino wool filters, which remove all activity, before discharging into the main gaseous effluent system. To ensure that conditions laid down for discharge of gaseous effluent are adhered to, there are facilities for continuous sampling of the effluent.

Chemical Research: Three main avenues

of research are being pursued at Dounreay. Firstly, there is development of solvent extraction techniques for processing new alloys and ceramic fuels which are being developed for fast fission reactors. Secondly, to determine how radiation may affect the chemistry of processes taking place inside a reactor, there is basic research in radiation chemistry. The third encompasses the wide field of both research and development work which is necessary to assess new chemical processes which will be associated with future fast fission and other experimental reactors.

This latest Dounreay report indicates that the new types of fuel, i.e., ceramic and liquid fuels, are likely to be plutonium based. A large part of the research work will be plutonium chemistry, which demands special techniques and a high degree of skill. The work has to be carried out in 'glove' boxes and by means of remote handling, if active materials are involved. Other interesting problems which are likely to be raised are the chemical reactions which take place between the coolant and the constructional materials of the reactor.

Dounreay Atomic Station Has Placed More Than 600 Contracts

OVER 600 contracts have been placed for the work now being carried out at Dounreay. Companies who are assisting in the building of the Dounreay station included the following:

For vital services at Dounreay, *Crossley Brothers Ltd.*, are installing 34 two-cycle scavenge pump diesel engines.

Structural engineers and bridge builders, *Alex. Findlay and Co. Ltd.*, of Motherwell, Scotland, have been associated with the atomic field since 1947, when work was started on the Windscale Atomic factory in Cumberland. The company has supplied and erected steelwork totalling over 5,000 tons.

Electrical generating plant for the fast breeder reactor will be supplied by the *General Electric Co. Ltd.* It will consist of one 15 MW steam turbo-alternator set and incorporates a number of special features on account of the unusual steam conditions imposed. Inlet steam will be at the comparatively low pressure of 15 p.s.i.g., and temperature of 518°F. It is envisaged that the steam conditions may be improved at a later date to 200 p.s.i.g., and 622°F and the turbine has been designed to operate under the higher inlet conditions without modification.

Ventilation and insulation has been undertaken by *Henry Hargreaves and Sons Ltd.*, *Bury, Lancs.* Metal clad insulation has been used in the vault housing the reactor. Duct work systems have been constructed from galvanised and stainless steel for the filtered warm air supply and active air extraction systems serving the main chemical plant buildings.

Orders received by *Head Wrightson Processes Ltd.*, cover for the supply of the reactor and all its associated primary and secondary coding, helium and process circuits and for the fuel element and facility handling equipment. The orders received include high-flux heavy water moderated thermal reactors and the

materials testing reactor. HWP's work consists of the design, engineering, purchasing, expediting, inspection, erection, testing, setting-to-work and maintenance of the plant.

Design and development of new types of special-purpose cranes for the Dounreay atomic power station have been carried out by the *Wharton Crane and Hoist Co. Ltd.*, *Reddish, Stockport, Cheshire.* A special 25-ton circular motion crane was constructed for the Dounreay station.

Electrical switchgear for Dounreay has been supplied by *A. Reyrolle and Co. Ltd.* The main electrical contractors are *James Scott and Co. Ltd.* In the chemical group building, the company have supplied 1,600 separate circuits using 30 miles of various connecting cables including 10,000 yards of special rubber and paper insulated armoured mains cable. The main switchboard is over 36 feet long and the lighting load of this one building is over 112kVA.

Over 4½ acres of Ruberoid roofing has been supplied by the *Ruberoid Co. Ltd.*, for as most of the Dounreay buildings have large roof spans, a lightweight roofing material was required. Moreover, it was desired to reduce heat loss from the buildings. Ruberoid Insulated Steel Deck was specified for most of the buildings. Protection of the Dounreay buildings by the company includes the use of Astos asbestos dampcourse.

Shell-Mex and B.P. Ltd. are supplying a large quantity of lubricating oil for engine installation and other Shell lubricants are being used at the station. These are highly stable in the presence of either gamma or neutron activity. Liquid fuels, are also being supplied by Shell-Mex and B.P.

Sixty miles of stainless steel seamless tubing in sizes varying from ½ in. o.d. to 6½ in. o.d. in varying thicknesses has been

supplied by *Talbot Steel Tube Co. Ltd.*

A major part in the manufacture and erection of the Dounreay fast reactor is being played by companies of the *John Thompson Group.* John Thompson have produced and erected the complex stainless steel reactor vessel, the liquid-metal circuits, the primary and secondary liquid-metal and liquid-metal/water heat exchange system and complete steam and water equipment with boilers, associated instrumentation and water treatment plant.

Dust control plant and allied equipment has been supplied in the maintenance workshops at Dounreay by *P. M. Walker and Co. (H.F.X.) Ltd.* The Cycol collectors can be used in conjunction with the Walker Drycol cloth filter tube collectors, for precleaning where heavy loadings of fine dust are being handled.

Installation of laboratory plant in the chemical separation group by *Thos. W. Ward Ltd.*, posed many technical problems. Many thousands of feet of stainless steel pipework of different qualities and gauges have been placed in various parts of the site. Radiographic and hydraulic testing to UK AEA specification have been carried out.

More than 300,000 ft. of Murex Fortrex 35 electrodes were used for all the manual arc welding of the 1,500-ton sphere which is 135 ft. in diameter and is made up from nearly 300 plates. It was built by the *Motherwell Bridge and Engineering Co. Ltd.*, and all welding was fully radiographed wherever possible. The main reactor vessel, a 30-ton stainless steel container 20 ft. long, was welded with Murex Nicrex electrodes by *John Thompson Ltd.* More than 3,500 radiographs have been taken to ensure that every welded joint is sound.

Other contractors using Murex welding electrodes at Dounreay include *Alexander Findlay Ltd.*, and *Matthew Hall and Co. Ltd.*

ICI Have Plans for Swansea District

EXPENDITURE by Imperial Chemical Industries in the Swansea district was referred to by Mr. P. T. Menzies, ICI finance director, on 4 May. The occasion was the presentation of long service tokens to 55 employees.

ICI spent £42 million on new factories in 1956, of which £5 million came to Swansea. 'There will probably be more money spent in Swansea in the future,' he said. 'We can see plenty of possibilities of providing better equipment in our factories and my job is to find the money.'

Money came from two sources, profits and investments. He had approached about 200 companies and 50,000 people for investments and had met with only one negative response.

Nitra-Shell Trial Spraying

SPRAYING of fertilisers from the air was recently tried in Scotland by Shell Chemical Co. The fertiliser used was Nitra-Shell, introduced to the UK this year. Containing 20.5 per cent nitrogen, Nitra-Shell consists of even granules which, it is claimed, are not blown away in the process and do not adhere to the surface of the leaf.

DISTILLATES

★ MARKS AND SPENCER 'have in the last few years pioneered in this country the application of processing quality control to large-scale retailing. This chain store sets high standards for the products it handles and has been instrumental in securing improvements in many everyday consumer goods.

One of the moving forces behind this drive for retailer quality is Dr. E. Kann, F.R.I.C., a director of the company who is by training an organic chemist and an economist. He was awarded his Ph.D. degree for studies in cellulose and protein chemistry and subsequently did post-graduate research. He first developed methods of quality and control and testing with a continental chain store.

This background of economist, chemist and chain store retailer is surely unique and Dr. Kann will draw on his experience in these fields when he opens the annual conference of the Textile Institute at Bournemouth on 21 May with a paper on 'The importance of processing quality control to the retailer'.

★ 'THE LONGEST table in London' graces the new headquarters of the Society of Chemical Industry at 14, 15 and 16 Belgrave Square. Elliptical in shape, only half of it is used in the Council room, but when the full table, seating 50 is required it fills the lecture theatre on the first floor.

The three houses, in Belgrave Square, in which are also housed the Society for Analytical Chemistry and the Institution of Chemical Engineers, had dual occupiers before being taken over by the SCI. No. 14 was the residence of the Duke of Norfolk and was last used by him as Earl Marshall at the Coronation. Nos. 15 and 16, owned by the Duke of Westminster, were the town house of the Duke of Bedford.

Cost of the new headquarters, opened last week by the society's president, Mr. Julian M. Leonard, (Carless Capel and

Leonard), including lease, adaption and equipping was £250,000. Mr. Leonard made a flying return for the opening from Switzerland where he had been attending a meeting of the SCI overseas section.

★ AN APT description of industrial inefficiency was given by Mr. J. Grange-Moore, works and personnel director of the ICI Witton Works, at the annual meeting of the Warrington Productivity Committee. Leader of the heavy chemical productivity team in 1952, Mr. Grange-Moore said that when one walked round an industrial organisation and saw that people were not using their brains as well as they might, then that place could be recognised as being inefficient.

He mentioned a plant where a process was being carried out with ten men per shift. After much intensive measurement and study, new proposals were brought forward and it was found possible to reduce the number of men to four.

★ THE RAPID rise of the explosives industry of the Thames estuary and its even more spectacular decline immediately after the first world war is the subject of an article that caught Alembic's eye in the current issue of *The PLA Monthly*. Most people in the industry to-day probably do not realise that it owed its origin on the estuary, as did the petroleum industry, largely to Acts of Parliament passed in 1871 and 1875. These laid down the limit of up-river navigation for vessels carrying oil and explosives.

Not long after, a firm known as Hay Merricks and Co. sought permission to blend and store gunpowder on the Cliffe marshes. It was stated that 'Little damage to sea walls is anticipated since gunpowder blows UP as against which dynamite blows DOWN.'

By 1900 a large factory had been built for the production of cordite; the Miners Safety Explosives Co. had established a plant near Thameshaven and Kynochs Ltd. set up an explosives factory near Shell Haven. Enormous expansion took place in the 1914-18 war and Kynochs soon became one of the largest UK explosives factory. By 1921, however, all the Thames-side factories fell victim to the process of 'rationalisation' and all of them had closed. Most of the sites were taken over for oil refining, Kynochtown, being renamed Coryton in the process.

To-day the trees on the Cliffe marshes hide the grass-grown ruins of the first of the estuary explosives plants. Despite the decline in production, the estuary still boasts an important trade in storage of explosives, averaging 40,000 tons a year.

★ AN UNUSUAL occasion on 28 May will be the launching of a ship specially designed for the owners, Marchon Products Ltd., chemical manufacturers, Whitehaven, one of the Albright and Wilson group. Built at Sunderland, the ship will be used to carry phosphate rock from North Africa to Whitehaven Harbour, a mile from the works.

Special equipment has been installed at Whitehaven to facilitate unloading. The vessel will be able to return via Europe to deliver detergent chemicals. Vital statistics are a 12 knot cruising speed, complement of 21, cargo capacity of 2,500 tons at 50 cu. ft. per ton, length of 265 ft. and breadth of 40 ft.

Launching ceremony will be performed by Mrs. Frank Schon, the chairman's wife.

★ THE NEW chemical plant that Ashburton Chemicals of Manchester plan to build at Glynllifon Park should do much to solve an unemployment problem in the Nantlle Valley. The site was inspected by Mr. Henry Brooke, Minister for Welsh Affairs, recently when he toured the district.

Mr. Brooke congratulated the Caernarvon County Council on its initiative in surveying the county water resources and thereby putting themselves in a position where they could promise to meet the water needs of new industries. This had certainly been a factor in interesting Ashburton's in the Glynllifon project.

★ IN ITS five years of existence, ICI's No. 1 cracking plant at the olefines works, Wilton, has given an outstanding performance of 363 days in one year, followed by a continuous run of 720 days, which takes some beating. The No. 1 plant came into operation in 1951 and the second started at the end of last year. When the third comes on stream early in 1959, ICI will have the capacity to make rather more than 100,000 tons a year of ethylene alone.

The group of ICI plants producing products from the olefines comprise the largest group of petrochemical plants in Europe and represent the largest venture undertaken by the company since its formation.



A section of the 45 ft. 6 in. table in the elegant council-room

Alembic

Chemistry Research Board Reports on Activities in 1956

RESearch on corrosion problems, separation of rare earths, semi-conductors, uranium and thorium extraction, radioactive tracer techniques and high polymers was carried out during 1956 by the Chemistry Research Board of the Department of Scientific and Industrial Research. The investigations are described in *Chemistry Research 1956*, published for DSIR by HMSO price 4s 0d (72 cents America) by post 4s 2½d.

Corrosion problems: Research at present in hand includes investigation of the possibility of improving the efficiency of corrosion inhibitors for use in anti-freeze mixtures for engine cooling systems.

Work was carried out on behalf of the British Shipbuilding Research Association on methods of prevention of rapid pitting of boiler tubes in Scottish marine boilers. As a result of investigations it was found that this pitting can be prevented by adding small amounts of copper to the steel used in manufacture of the tubes.

Corrosion in buried pipes and underground metal fittings in S.E. England was found to be due to complicated microbiological processes. Well below the level of the pipes the ground contained large quantities of sulphates. These sulphates were being converted to sulphides by the action of sulphate-reducing bacteria. After diffusion upwards through the soil, the sulphides were being converted by sulphur-oxidising bacteria into sulphuric acid, which attacked buried metal and concrete pipes. The CRL recommended drainage of the soil, followed by liming to increase the pH value, which in places proved to be under 2.0.

Problems of corrosion in industrial equipment and factors affecting atmospheric corrosion of various types are reported and methods and agents investigated are detailed.

Rare Earth Studies

Separation of Rare Earths: Columns of ion-exchange resins have given satisfactory separation of a number of rare earth metals. Study of the application of ion-exchange methods of separating rare earths is stated to have improved the understanding of the process and particularly the control of the various factors involved in a separation. Columns containing a mixed ammonium-lanthanum loading repaid investigation. A large scale apparatus capable of handling kilogram quantities of rare earths is now being used by the department.

Semi-conductors: Investigations on the purification of elements of interest as semi-conductors has been carried out using the zone-melting method. Very pure bismuth can be produced using this technique but with other elements, including tellurium and indium, the method was only capable of removing some of the commoner impurities.

Attempts to purify selenium by zone-melting were abandoned as it was found that the process invariably converted the element into the vitreous modification, as a result of which no further purification can occur. Distillation of the element is stated to give adequate purification.

Existing methods of detecting and estimating very small quantities of impurities have not proved to be sufficiently accurate. Therefore, a team of research workers is being set up within the Department to develop new techniques and to investigate the potentialities of the solid source mass spectrometer in this work.

Radiochemical studies: Extraction of uranium and thorium from minerals and ores has been the main concern of the radiochemical group. Investigations into the direct adsorption of uranium from acid ore pulps, as indicated in *Chemistry Research, 1955*, have continued and satisfactory flow-sheets have been produced. A complete study has been made using a series of Permaplex A-10 membranes and solutions of varying sulphate and uranium concentrations.

Recovery of thorium from thorite-bearing ore has been studied and a process developed suitable for large scale operation. The thorium is selectively extracted with acid and recovered from the pregnant liquor by direct precipitation.

Alkali-breakdown for the recovery of thorium from monazite rock or sand has been successful. A product containing 90 per cent ThO₂ is obtained.

Further work has continued on the

improvement in gold adsorption found when using dimethylamine resin PX2 prepared in the DSIR laboratory. A resin with 6-10 per cent strong base groups has afforded the best compromise by combining a high selectivity for gold with a high working capacity. Pilot plant experiments carried out at the Globe and Phoenix mine at Que Que in the Sebakwe district of Southern Rhodesia, have indicated that the process, which is being developed in the UK by William Broby of Rickmansworth can be expected to prove much cheaper than conventional processes so far in use for extracting gold from standard 'run of the mill' ores.

A certain amount of work has been done on the extraction of other metals, in particular, the recovery of niobium from an ore.

Use of Radioactive Techniques: Tracer methods were used more frequently during the year, some 1,700 individual radiometric determinations being made, which included investigations of the zone melting process, separation of rare earths by paper chromatography and comparison of various methods of purifying mercury.

High Polymers: Structure and permeability of polymer films and work on the fractionation of polymers and determination of their molecular weights have been the two principal lines of investigation into high polymers. Basic research into the ion-exchange and allied properties of cross-linked polymers is also continuing.

Of industrial importance in the treatment of brackish water and the treatment of effluents is the preparation of ion-selective polymer films. Now being sponsored jointly by the Department and the National Research Development Corporation is a scheme of research and development in the large scale application of electro-dialysis to the demineralisation of water and to similar projects.

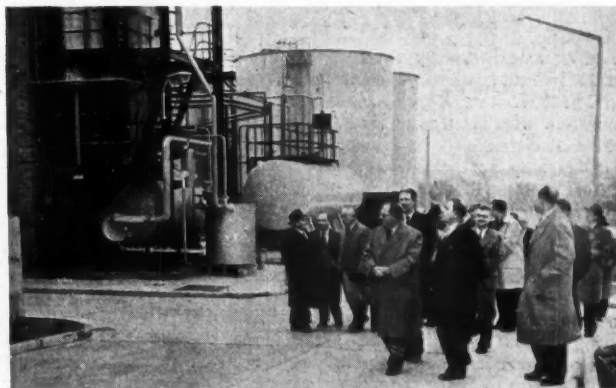
M & B Open New Norwich Factory

OPENING the new May and Baker factory at Norwich on 9 May, the Lord Mayor of Norwich, Councillor Arthur South, described it as the greatest single industrial event that has happened in Norwich for 100 years. After the opening ceremony a tour was made of the site and visitors saw one of the first complete process buildings, in which production of

Tropotox weedkiller is being carried out.

Main services, steam, water, gas and compressed air are carried round the site in a service trench below ground level. Advantages claimed for this system include an initial economy of steel and ready accessibility for maintenance. Pipes are carried from the service trench into the production buildings through tunnels.

The managing director of May and Baker Ltd., Dr. T. B. Maxwell, and the Lord Mayor of Norwich, Councillor Arthur South, tour part of the new 100-acre May and Baker factory at Norwich



NEW ICI PLANT INCREASES BUTANOLS OUTPUT 7 TIMES

SECOND large scale carbonylation plant of Imperial Chemical Industries Ltd., started up at Billingham, County Durham, has increased the company's output of butanols seven times. The plant at Billingham for the carbonylation process is now thought to be the largest in the world. All the UK's needs for butanols, which are used as solvents and intermediates in a wide range of industries, can now be met from home supply.

UK demand for butanols has consistently exceeded home production in recent years and imports have been made from the US, Germany and Sweden. For the past nine months supplies of both butanols have had to be rationed.

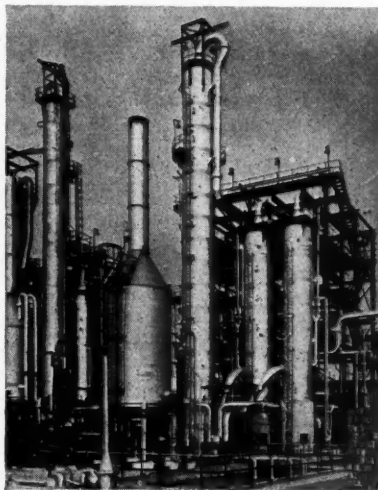
ICI's first carbonylation plant was started up six years ago. Since then it has been producing a number of products, including nonanol, Alphanol, iso-octanol, propylene from the oil-cracking plants at Wilton Works, and butanols.

Construction of the new plant started nine months ago. It was designed by the oil design section of the chief engineers department, in co-operation with the technical department. The work was done by the construction section of the company's engineering works services. Some of the pipework was done by Ashmore, Benson Pease and Co., of Stockton.

Work included rebuilding some of the existing plants and installing additional

high pressure vessels, injectors, compressors and pipework. A new control room which also controls one of the petrol stalls was also constructed.

The new plant will leave the first carbonylation plant entirely free for the production of iso-octanol, Alphanol and nonanol, used increasingly for the manufacture of phthalates and other esters.



New butanols plant

Three New Plants will be First to Use Shell Ethylene Oxide Process

AT THREE locations, two in the US and one in England, the Lummus Co. is building plants which will utilise the Shell Development Co's direct oxidation process for the production of ethylene oxide. Designed and engineered by Lummus, they will be the first commercial scale plants to use Shell's process. Each will have an annual capacity of 60 million lb.

At the Wyandotte Chemicals Corporation's facilities at Geismar, Louisiana, most of the high purity ethylene oxide produced will be converted by thermal hydration to ethylene glycol for industrial and anti-freeze uses. The Calcasieu Chemicals Corporation installation at Lake Charles, Louisiana, will also have

an ethylene glycol section.

The third plant is to be built at Partington for Petrochemicals Ltd., one of the Royal Dutch/Shell Group.

In the Shell process for ethylene oxide production, ethylene is reacted with oxygen over a silver catalyst in a six-bed reactor. All three plants use oxygen which is said to require less capital investment than would the use of air.

The advantages offered by this process, which has been thoroughly tested in pilot plants, include: high yield and the virtual elimination of waste disposal problems encountered in the chlorohydrin process.

BS for Flameproof Enclosure

A REVISED EDITION by the British Standards Institute has now been issued of BS229:1957, the key specification for enclosure of electrical apparatus for use where flammable or explosive gases or vapours may be present.

Research by the British Electrical and Allied Industries Research Association in collaboration with the Safety in Mines Research Establishment, has evolved a more precise method of grouping than that of the 1946 edition of the standard, and the method of assessing the statistical maximum safe-gap for the gases and vapours has been reconsidered. Requirements in Group II for the sleeve bearings

of large rotating machines for gases and vapours have been changed to make construction and operation of the apparatus more practicable.

For apparatus mounted in the enclosures reference should be made to the appropriate British Standard. Information on the experimental work, is given in an Annex which also includes guidance regarding gases under examination but for which insufficient data are as yet available to permit requirements to be specified.

Copies of this Standard can be obtained from British Standards Institution, 2 Park Street, London W1, price 7s 6d.

Intensive Programme of Atom Metals Research

INTENSIVE RESEARCH into the application of thorium and of thorium alloys in future UK nuclear power stations is being carried out by British Non-Ferrous Metals Research Association in collaboration with the UK Atomic Energy Authority.

To plan the programme and to offer general guidance on future activities of the association in connection with metallurgical problems associated with nuclear power development, a new committee—the Industry Committee for the Metallurgy of Nuclear Energy—has been set up.

Thorium, raw material for nuclear fuel uranium 233, is particularly useful as a potential fuel in fast breeder type nuclear reactor furnaces, such as that now being constructed at Dounreay. Uranium 233 is more easily separated from its parent material, thorium, than plutonium is from its parent material uranium 238.

The British Non-Ferrous Metals Research Association are also undertaking studies on the development of a crack free chromium plating process, and the development of a new type of lead alloy for sheathing electric cables.

Borax Introduce New Anti-Fire Chemical

A NEW compound developed by US research chemists for use against forest and bush fires is being introduced in the UK by Borax Consolidated Ltd., London SW1.

Firebrake—a sodium calcium borate preparation—was developed by the US Borax and Chemical Corporation working with the US forest services and was first used on a large scale against a series of major forest fires in California last summer.

The compound, which is supplied dry in 50 lb. sacks and is mixed with water, can be used by either ground teams or from the air.

The preparation can be used as a fire deterrent—danger spots can be sprayed with Firebrake before fires start and it acts as an effective fireguard.

Firebrake is now available in this country and the suppliers are able to give details of the necessary modification to aircraft of the type used for spraying agricultural chemicals.

Nuclear Power Course at Imperial College

From October next Imperial College of Science and Technology, London, are to have a 12-month post-graduate course in nuclear power. This follows the recent establishment at the College of a Chair of Nuclear Power, to which Dr. J. M. Kay was appointed. Professor Kay will direct the course in collaboration with the Departments of Engineering, Physics and Metallurgy.

This course will be open to graduates in mechanical, and electrical or chemical engineering.

INDIA GIVES HIGH PRIORITY TO EXPANSION OF ALCOHOL OUTPUT

New Alcohol-based Industries to be Set Up

DEVELOPMENT of an Indian industrial and power alcohol industry has been accorded high priority in the second five-year-plan. The total production of alcohol from molasses is now of the order of 15.5 million gall. a year (5.3 million gall. in 1946)—an increase of 300 per cent in 10 years.

In the second plan, a target for the production of 30 million gall. (power alcohol 18 million gall.; industrial alcohol, 12 million gall.) has been fixed. Licences have been granted for the setting up of several factories and expansion of existing ones to raise the installed capacity to 36-37 million gallons.

The sugar industry in India is set for considerable expansion and, with a target of 2.25 million tons of sugar per year, about 900,000 tons of molasses would be available every year by 1960-61 for the manufacture of alcohol. If the industry made use of all the additional production of molasses, India could well become the largest world producer of fermentation alcohol in the next 10 years.

The Government is considering several proposals for setting up alcohol-based industries. It is expected that with the setting up of some of these industries, the consumption of industrial alcohol would go up from the present level of 4 million gall. to 30-35 million gall. a year by 1960-61.

Synthetic Rubber Plant

It is proposed to establish a 20,000 ton synthetic rubber plant in Uttar Pradesh which could consume 10-12 million gall. of alcohol every year; this unit would come into operation at an early date. Two factories for the production of polythene have also been licensed. These would require 3-4 million gall. of alcohol a year. The expansion in the manufacture of acetate rayon would need 4-5 million gall., and substantial quantities would be required for the production of acetic acid, ether, acetone, DDT etc.

Basic Chemicals. Production of soda ash, caustic soda and liquid chlorine is to be increased nearly fourfold and that of sulphuric acid nearly threefold during the second five year plan. The high targets have been fixed because of the record increase in the production of these chemicals achieved in the last few years.

The production of soda ash by 1961 is expected to go up to 250,000-300,000 tons from 77,270 tons in 1955. The output of caustic soda will increase to 200,000 tons from 34,250 tons in 1955 and of liquid chlorine to 250,000 tons from 14,580 tons in 1955. The target for sulphuric acid has been fixed at 5-600,000 tons by the end of the plan period, an increase of over three times the production in 1955.

Glass Industry. The production of glass and glassware has gone up from 87,270 tons in 1950 to 143,587 tons in 1956—an

increase of 65 per cent. The Government have approved the setting up of 15 new factories and the expansion of six existing units which would increase the capacity of the industry by 44,000 tons per year. The items to be manufactured are those which are not being produced in the country now.

The preliminary report of the Russian team of experts on the setting up of an

INDIAN NEWSLETTER

- Among alcohol based industries to be established are plants for synthetic rubber and polythene.
- Basic chemicals have been set much higher production targets, including threefold rise for sulphuric acid to 5-600,000 tons a year.
- Big expansion plans are in hand for fertiliser plants at Sindri, Neyveli and Nangal.
- CFRI has sold a new process of preparing cation exchange resins (carbions) from coal to a German firm.
- Rs 15 million are to be spent on a new carbon black factory to be fed with materials from a Caltex refinery now being built.
- India's first polythene plant is expected to go on stream by end-1958.

optical glass plant, with Russian collaboration, is now being examined by Government technical experts.

Sindri Fertilisers. The expansion scheme designed to increase the capacity of the factory by over 50 per cent has made considerable headway. The scheme provides for processing 10 million cu. ft. of coke oven gas to produce 70 tons of urea and 400 tons of ammonium sulphate-nitrate per day thus raising Sindri's total output from 1,000 to 1,470 tons a day.

The Rs.110 million expansion plan, now under way, developed from a unanimous recommendation by an expert committee which made a global tour to study all aspects of fertiliser production.

Adjacent to the Sindri plant has arisen a new cement factory which utilises Sindri's by-product calcium carbonate (for every 1,000 tons of ammonium sulphate produced about 900 tons of calcium carbonate are obtained). Other allied industries which have been set up are benzole, benzene and coal tar. If the new plans for methanol and Nitro-chalk come to

fruition, Sindri may well become the Ruhr of India.

Neyveli Fertiliser Plant. The standing committee of technical experts on the Neyveli lignite project has decided on the production of urea alone in the fertiliser unit at Neyveli (Madras). The decision has been taken in view of the satisfactory results obtained from a large number of trials with this fertiliser.

The proposed unit at Neyveli is, therefore, being planned and designed for the production of urea of the order of 70,000 tons of nitrogenous content a year by the total recycle process. It is expected to be one of the largest urea plants in the world.

It has been decided not to appoint any overall consultants at present for the fertiliser part of the project. Broad specifications of the main groups of plant will, therefore, be drawn up and tenders invited for package supplies of gasification and carbon monoxide conversion plant, ammonia synthesis plant and the urea production plant.

Tenders for the plant will be issued by about June or July 1957 and the plant will be ready to go on stream by July or August 1960, by which time lignite mining in commercial quantities is also scheduled.

Electrolysers for Nangal. The Government have approved the placing of an order with Oronzio De Nora of Milan, Italy, for the supply of electrolysers for the Rs.220 million Nangal fertilisers and heavy water project. The total cost of the supply to be made by the Italian firm is estimated at Rs.35 million. Satisfactory credit facilities have been arranged, according to which the first instalment of 10 per cent of the cost will be payable immediately and subsequent instalments in 1960 and the following years.

First Delivery

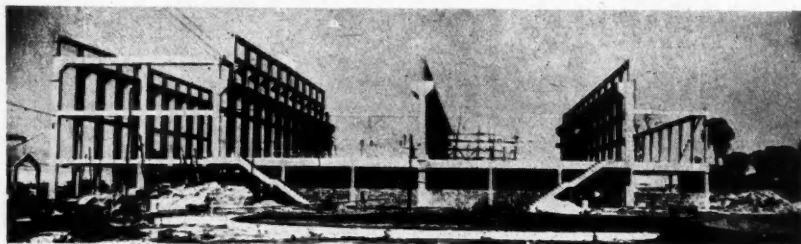
The first delivery of the equipment will start in March 1958 and the entire equipment will be delivered at the project site by April 1959.

Non-caking Ammonium Nitrate. Ammonium nitrate has not found general use as a fertiliser because of its poor keeping qualities; it absorbs moisture from air forming hard cakes. A non-caking ammonium nitrate fertiliser has been prepared at the Regional Research Laboratory, Hyderabad by coating fine river silt or bone powder on the salt. The powder compares favourably with commercially available products from Germany and Finland.

Carbions. A new process of preparing cation-exchange resins (carbions) from coal, developed at the Central Fuel Research Institute, Dhanbad, is being acquired for commercial purposes by a foreign firm. The licence of the process is being issued exclusively to a German firm by the National Research Development Corporation of India, for use in the territories of West Germany, France, Scandinavia, Holland, Belgium, Spain, Portugal, Italy, Yugoslavia, Switzerland, Greece.

A Calcutta firm has already been granted, a licence to produce the material for Indian requirements.

The ion-exchange material prepared



Waste gas cracking plant being built at Sindri. The waste gas will be used to produce new fertilisers

from coal is used extensively for water softening for boilers, laundries, textile mills, dyeing houses, breweries, ice plants etc.

The process developed possesses several distinct features. Depending upon the type of coal used, it can secure savings in sulphuric acid consumption, gives larger yields of material, and more uniform product than the straight sulphonation method.

Research in Essential Oils. Proposals for the establishment of four research centres for essential oil, one each at Dehra Dun, Kanpur, Poona and Bangalore, were among those approved by the Council of Scientific and Industrial Research at its recent meeting in New Delhi. A sum of Rs.3 million has been provided in the second five-year plan for research in essential oils.

Production of Sulphur. The problem of indigenous production of sulphur was one of the important items discussed by the board. Some of the proposals made in this context are: proving the pyrites resources in Bihar and Mysore; installation of a pyrites burner; utilisation of gypsum as a source of sulphur and the setting up of a plant of 100 tons (sulphur) capacity, and drawing a detailed project for the purpose.

Carbon Black. A factory for the production of carbon black is planned at Visakhapatnam at an estimated cost of Rs.15 million. The by-products of the Rs. 150 million Caltex oil refinery now under construction at Visakhapatnam are

likely to provide the raw material requirements of the factory. Nearly 6,000 tons of carbon black valued at Rs.6 million are at present annually imported from the US.

The carbon black requirements of the Indian rubber industry are estimated at 6,000-7,000 tons a year. About 500-1,000 tons are required by the paints and printing ink industry; about 1,000 tons of thermal acetylene black is consumed annually in dry cell manufacture.

Investigations on the production of carbon black from indigenous raw materials are in progress at Shri Ram Institute for Industrial Research, Delhi, National Chemical Laboratory, Poona and Central Fuel Research Institute, Jealgora. Modified channel black and furnace black processes have been developed for the production of carbon black from the tar effluents of producer gas plants of Fertilizers and Chemicals Ltd., Travancore.

A pilot plant for making carbon black from several grades of fuel oils has been designed and fabricated at the National Chemical Laboratory, Poona. The blacks produced conform to standard specifications for thermal blacks.

First Polythene Plant. The Alkali and Chemical Corporation of India have undertaken installation of India's first polythene plant at Rishra, near Calcutta. The plant, expected to cost £3 million, will produce 3,500 tons of polythene per year. Work on the project is expected to be completed by 1958.

Scherer's Open New Encapsulating Plant on Bath Road

THE NEW R. P. Scherer Ltd., factory at Bath Road, Slough, Bucks, which is claimed to be the newest and most modern gelatin capsule plant outside America was recently opened.

The R. P. Scherer organisation, comprising associated companies in the US, Canada, Germany, South America and UK, now handles at least 80 per cent of the world's production of gelatin capsules. Average output of 20 rotary die machines installed at Slough is 10 m. capsules of varying shapes and sizes, a day, and of something like 15 million smaller sized capsules a day. There is capacity for additional machines, to increase still further this capacity.

Until recently production has been almost entirely devoted to encapsulating pharmaceutical products, particularly for export. Now there is increasing use of the gelatine capsule as a unit pack for other consumer goods, such as machine oils, insecticides, special adhesives etc.

During the manufacturing process very accurate checks are maintained on the weight of filling being pumped into each capsule. These checks are carried out on laboratory-type balances having an accuracy of 1 milligram.

The new factory is equipped with laboratories capable of undertaking complete control over all materials and products, the latest addition being a microbiological laboratory for the assay of antibiotics and in vitamins.

Export Orders for Machinery

Orders worth nearly £1½ million for plastics machinery have been placed with Burtonwood Engineering Co. Ltd., Warrington, from Australia, Japan and India. This is the first time the company has broken into these markets. The orders follow completion of work worth £200,000 for the Texas Eastman Co., Spencer Chemical Co. and Petrochemicals—all of the US.

Trade Opportunities with Poland and East Germany

POLAND is about to develop a chemical industry concerned with the production of coal by-products and a wide range of plant is needed. This is stated by the Birmingham Exchange and Engineering Centre which, during participation at the Leipzig International Fair, contacted Polish authorities. There is also an interest in machinery for sulphur mining.

Trading with Bulgaria is difficult owing to a lack of a suitable trade agreement, but should trade become possible, Bulgaria would buy chemicals.

The Centre reports that the East German chemical equipment export and import organisation has been granted a sterling allocation. Some trade with British companies has taken place and the organisation would be prepared to buy air-cleaning plant, chemical pumps, special chemical valves and electro-plating plant.

Exports to Sterling Area from US and OEEC Countries

CHEMICAL EXPORTS of North American and OEEC countries to the sterling area from 1952 to the third quarter of 1956 have now been presented (*Board of Trade Journal*, 3 May 1957, p. xvi). The quarterly averages are in US \$ million. North America includes the US and Canada.

To	1952	1953	1954	1955	1956	North American Countries Exports	OEEC Countries Exports
United Kingdom	11	11	19	21	22	25	28
1st Qtr.	22	20	23	20	18	34	36
2nd Qtr.	22	23	20	21	21	34	39
3rd Qtr.	20	20	21	20	20	34	34
Rest of Sterling Area	18	15	19	21	22	30	32
1st Qtr.	22	23	20	21	21	42	46
2nd Qtr.	22	23	20	21	21	44	45
3rd Qtr.	22	23	20	21	21	43	47
4th Qtr.	22	23	20	21	21	52	52
Sterling Area	29	26	38	41	45	55	60
1st Qtr.	29	26	38	41	45	76	83
2nd Qtr.	29	26	38	41	45	78	81
3rd Qtr.	29	26	38	41	45	76	79
4th Qtr.	29	26	38	41	45	94	94
1st Qtr.	41	41	41	41	41	90	87
2nd Qtr.	41	41	41	41	41	87	80
3rd Qtr.	41	41	41	41	41	80	80

SCI Party to Visit Radiochemical Centre

A party of London section members of the Society of Chemical Industry will visit the Radiochemical Centre, Amersham, on 19 June.

REGISTER OF RESTRICTIVE TRADE PRACTICES

65 Chemical Agreements Filed

THE FOLLOWING are some of the agreements which have been registered under the Restrictive Trade Practices Act 1956. There are about 1,400 agreements altogether, of which 65 are in the chemical and pharmaceutical fields. The register may be inspected on weekdays between 10 a.m. and 4.30 p.m. at Chancery House, Chancery Lane, London WC2, 9 Wemyss Place, Edinburgh 3, and 64 Chichester Street, Belfast.

Chrome and Green Arrangement: Ten firms are listed as members of the Chrome and Green Arrangement. The objects and scope of the arrangement are to establish selling prices below which it would not be possible to afford the research and development work essential to the continuing technical improvements of chrome pigments and the safeguards both statutorily imposed and otherwise, necessary for the protection of the health of workers in the industry.

As the cost of raw materials and processing is similar for all makers' products the minimum selling price is based on the chemical composition of a pigment and thus no restriction is placed on the improvement of physical characteristics.

The arrangement covers lead chrome yellows, pure and reduced, lead chrome greens, pure and reduced, zinc chromes and greens and barium chromate. Molybdate chromes are excluded from the arrangement in respect of price but may be included in a composite contract.

Monomethylol Stearamide: An agreement exists between Tootal Broadhurst Lee Co. Ltd. and Astor Boisselier and Lawrence Ltd., 9 Savoy Street, London WC2.

Soda Crystals: An agreement exists between Wm. Gardiner and Co., 15 Biggan Place, Glasgow, the Lanarkshire Manufacturing Co., 51 Society Street, Glasgow, McArthur and Jackson Ltd., 98 Dobbie's Loan, Glasgow, D. McDougall and Co. Ltd., 18 Charles Street, Glasgow, David Willox Ltd., 50 Quarryknowe Street, Glasgow, all manufacturing chemists and the Scottish Soda Crystals Manufacturers' Association Ltd., 98 Dobbie's Loan, Glasgow.

Keeping Prices Down

Potassium Carbonate Association: 14 members are shown. The association states that its object is through the agency of its members to purchase potassium carbonate and distribute in the UK. 'Due to arrangements between producers supplies are limited and by preventing undue competitive demand from those producers the association will endeavour through its appointed purchasing members to keep the price at the lowest possible level for the benefit of its members and the consumers in this country'.

UK White Lead Convention: 12 members are listed. The organisation states 'Collec-

tive organisation is necessary to make mutually fair agreements with other branches of the industry and with labour. In the latter case such agreements must deal not only with wages but also with the general welfare of operatives in white lead works. The interests of all manufacturers of white lead are identical in this connection'.

'From experience it is now an accepted fact that Government departments prefer to deal with organised trades and much more can be done by co-operation in every direction than by individual efforts of manufacturers'.

Phenol Producers' Association: In a memorandum the association states that two separate agreements in their activities relate to phenol and o-cresol. The agreement between members is not intended to be legally enforceable and does not provide for any penalty for non-compliance.

Cresylic Acid Refiners' Committee: Show an agreement relating to prices of cresylic acid. In a memorandum the committee states 'With the exception of a refinery in Scotland, one in Northern Ireland and one in England, membership of the Committee comprises all refiners manufacturing standard grades of cresylic acid in the UK'.

Tar Acid: An agreement is shown between Normanby Park Tar Supplies Co. Ltd. of Somerset House, Temple Street, Birmingham 2, and Norman Hugo Graesser of the Chemical Works, Sandycroft, Chester.

National Benzole Co. Ltd. detail a scheme for the evaluation of crude benzole and an agreement for the sale and purchase of refined benzole.

Sodium Hypochlorite: An agreement in regard to supplies of sodium hypochlorite solution is shown between Barter Trading Corp. Ltd., London, Cocker Chemical Co. Ltd., Yorkshire, L. Dennis and Co. Ltd., Manchester, Domestos Ltd., Newcastle, Imperial Chemical Industries Ltd., London, Laporte Chemicals Ltd., London, Oswald M'Cardell and Co. Ltd., Greenfield, Nr. Oldham, Milton Antiseptic Ltd., London, Murgatroyd's Salt and Chemical Co. Ltd., Sandbach, Cheshire, John Riley and Son Ltd., nr. Burley, The Staveley Iron and Chemical Co. Ltd., nr. Chesterfield, Voxsan Ltd., London.

UK Glycerine Producers' Association: The association states that the objects of its rules are:—

- To enable all members to dispose of glycerine at prices which are fair and reasonable from the point of view of seller and buyer and from the point of view of consumers and users of other products of which glycerine is a by-product, and to enable fair selling prices to be negotiated with large buyers.
- To minimise excessive fluctuation in the prices of glycerine.

- To provide, at times when the supply of glycerine exceeds the demand, an incentive to conserve stocks in the national interests.

Crude Pyridine: Midland Tar Distillers Ltd. of Oldbury, Birmingham, show a list of six parties to their pooling scheme for crude pyridine. The company states that it made arrangements with a number of crude pyridine producers to send their crude pyridine to the MTD's refinery to be refined on a competitive basis, payment for the material to be made each six months on the basis of the trading results for that period calculated on an agreed formula. 'The arrangement has been operated on a general agreement and no hard and fast legal document is in existence'.

Crude Tar Acids: Agreements whereby the Northern Gas Board and the National Coal Board (East Midlands Division) agree to sell and Bristol and Western Tar Distillers Ltd. of St. Phillips, Bristol 2, agree to buy crude tar on a co-operative basis.

Tar Acids: Agreement between South Eastern Gas Board and PR Chemicals Ltd., of Lancaster Place, Strand, London.

Refining Crude Benzole: South Eastern Tar Distillers Ltd., have agreements with Hastings and St. Leonard's Gas Co., and also with the South Eastern Gas Board, Burt, Bolton, and Haywood Ltd., and Lane Bros. (Tar Investments) Ltd.

Crude Tar Acids: Agreement is shown between refiners (Bitmac Ltd., British Tar Products Ltd., Bristol and Western Tar Distillers Ltd., R. Graesser Ltd., Chas. Lowe and Co. (Manchester) Ltd., Mirvale Chemical Co. Ltd.) and distillers (E. Hardman Son and Co. Ltd., National Coal Board (North Eastern Division), Thomas Ness Ltd., North Eastern Tar Distillers (Sadlers) Ltd., North Thames Gas Board, Scottish Tar Distillers Ltd. and Staffordshire Chemical Co. Ltd.). A memorandum on the agreement relating to the purchase and sale of crude tar acids states that there is no written agreement but that it is agreed during the period of 2 years from 1 January, 1955, and thereafter until determined by 6 months' notice to that effect, that:

'Each tar distiller will only sell crude tar acids at the price based on the agreed formula to his customers; the refiners will only buy "free" crude tar acids from the UK sources at the price based on the agreed formula; the refiners agree to supply statistics to an independent firm of accountants who half-yearly ascertain the average selling price of certain grades of end-products which are to be applied in the formula; and from time to time a sub-committee consisting of three tar distillers and three refiners, fixes interim prices'.

Tar Acids: PR Chemicals Ltd. have an agreement with the Prince Regent Tar Co. Ltd., the South Western Tar Distilleries Ltd., Plymouth Tar Distilleries Ltd., and Leonard and Co. (Shoreham-by-Sea) Ltd. and with South Eastern Tar Distillers Ltd.

Synthetic Resins: Agreement between Lewis Berger & Sons Ltd. and Petrochemicals Ltd., Pinchin Johnson and Associates Ltd. and Styrene Co. Polymers Ltd.

Sulphate of Ammonia. An agency agreement between the British Sulphate of Ammonia Federation Ltd. and Imperial Chemical Industries Ltd. for the sale of ammonia is shown.

Chemical Traders Welcome Free Trade Plans

THE PLAN for breaking down trade barriers in West Europe is described in the annual report of the British Chemical and Dyestuffs Traders' Association as being 'Without doubt imaginative and offering a great opportunity for modern production techniques.'

The report adds 'How soon a provisional treaty for a European free trade area will be drafted is not yet clear, but international negotiations are well advanced and the implications of the proposals will require our increasing attention.'

Presented at the annual meeting held in London by Mr. C. F. V. Blagden, chairman, who was re-elected, the report said that the development of a free trade area served to emphasise the value of the association.

The report expressed the view that the Safeguarding of Industries Act, extended in 1954 for a period of five years, had since outlived its intended purpose so far as the chemical industry was concerned and there would be no justification for renewing the protective duties when the Act expired in 1959.

Position of KID

It is said that the rewriting of the UK tariff in Brussels nomenclature form would involve the question of assimilating the Key Industry Duties to the general protective tariff. The report stated that it was already clear that the relevant draft transpositions would have the effect of imposing KID on new and some existing products, which under the present procedure would not incur the higher rate of duty unless an application was made for KID listing.

The association was opposed to that form of protection, where none was needed. The question had been discussed with the Board of Trade with a view to provision being made for such products to continue at the general *ad valorem* duty rate or, in the case of new products, for exemption from the higher duty on application of any interested party.

The report expressed the view that the procedure by which temporary exemption from KID was granted for products not made in the UK in adequate quantities, would be more realistic if the shortfall in production relative to home needs were limited to a margin of 10 per cent.

During the year, the association received an assurance that the power to impose anti-dumping or countervailing duties under the Customs Duties (Dumping and Subsidies) Act would not be used for any wider protective purpose.

Speaking at the annual lunch, held the same day, Mr. Bache said that the chemical industry in the US was going forward with its programme of expansion at a fantastic rate. It was significant that very recently, possibly owing to the change of domestic policy in the US that the stockpile was not so large as it was and as a result certain heavy chemicals had been substantially reduced

in price during the past week or so.

He described the proposed European free trade area as a new conception of a revolutionary economic theory. 'Whatever opinion we might have as to its desirability we must all conceive that this is a bold experiment.' Whatever might emanate from it, it was necessary to realise the important role of the merchants. Despite the difficulties and the problems involved, the energy and tradition of the merchant entities in this country would go a long way to provide the smooth working of the free trade area.

Proposing the toast of 'The Association', Mr. Gunnar Hagglof, the Swedish Ambassador, referred to the contribution that Nobel had made to the British chemical industry. Some of his companies had been merged with ICI, but many of his ideas were not put into practice until long after his death, for instance, synthetic fibres.

It was little known that trade between Sweden and England had now reached an annual turnover of £300 million and that for many years Sweden had been the greatest trading partner of the UK in Europe. After careful consideration, the Swedish administration had come to the conclusion that free trade in Europe would be of great advantage, not the least in chemical products.

Other speakers at the lunch were Mr. Blagden, who proposed the guests and Lord Grenfell, who responded.

£4 Million Extensions for BP Refinery at Grangemouth

MAJOR EXTENSIONS costing £4 million are to be put in hand at the oil refinery at Grangemouth which is owned by BP Refinery (Grangemouth) Ltd. Capacity at the refinery will then be increased by one million tons to three million tons of crude oil annually. Additional installations at the Finnart, Loch Long, oil terminal are required, and should be completed, it is hoped, by the autumn of 1958.

New units to be erected at the refinery include erection of a new large crude oil distillation unit, two new copper chloride treatment plants for refining the distillates (mostly kerosene and spirit), and a 'petricio' plant for treating oil gases for the removal of acids, etc.

Additional process tankage and new 'intermediate' tankage will be required. Road and railway despatch facilities, and also laboratories and workshops are to be expanded. A new acid burnery installation will be for the disposal of tars from the acid treatment plant. A new steam boiler will be put in to increase the boiler house capacity.

This expansion ties in with related activities of the Grangemouth refinery. British Hydrocarbon Chemicals Ltd., jointly owned by the British Petroleum

Reactor Technology Training at Harwell

THE NEXT reactor technology courses specially arranged for senior technical executives will be held at the Reactor School, Atomic Energy Research Establishment, Harwell, from 21 to 31 October, and from 6 to 16 January, 1958. These will be the first such courses for senior executives open to overseas as well as British students.

The courses are planned to give to senior industrialists with a technical background an overall appreciation of the problems of reactor technology. The lectures will cover the physical, metallurgical and engineering problems involved in the design of power reactors and the chemical problems of fuel and effluent processing.

There will also be lectures on the UK nuclear power programme and on the organisation of the UK Atomic Energy Authority and its relations with industry. There will be visits to laboratories and reactors within the establishment.

Fee for the course is £50 (excluding accommodation). Selection of the students will be made three months before the start of each course.

Drugs and Fine Chemicals Industry's Pay Rise

Workers in the drugs and fine chemicals industry are to receive an extra 8s a week for men, and 6s for women, with effect from 14 April. This follows the recent increase of 2½d an hour for men and 1½d for women employed by the Imperial Chemical Industries Ltd., and other heavy chemicals, plastics and fertiliser companies.

Co. and The Distillers Co., draws feedstock from the adjacent refinery to produce ethylene and isopropyl alcohols. It is also producing butadiene for synthetic rubber manufacture. The company supplies Forth Chemicals Ltd., jointly owned by British Hydrocarbon Chemicals and Monsanto Chemicals Ltd., with ethylene for styrene production. Ethylene will also be sold to Union Carbide Ltd., whose plant for the manufacture of polythene is now under construction.

Another outlet for the refinery is Grange Chemicals Ltd. in which British Hydrocarbon has a joint interest with the Oronite Chemical Co. This company produces alkylate for synthetic detergent manufacture.

Wills

SIR JOHN LIONEL SIMONSEN, F.R.S., of 3 Wildcroft Manor, Putney Heath, director of research, Colonial Products Research Council, 1943-52, professor of chemistry, University College of North Wales, Bangor, 1930-42, secretary of the Chemical Society and a member of the Agricultural Research Council, 1945-49, who died on 20 February last, aged 73 years, left £19,436 net.

Overseas News

NEW DEVELOPMENTS IN NORWAY'S CHEMICAL INDUSTRY

HYDROGEN peroxide is to be produced in Norway by the Degussa company who have acquired the Gristle-foss factory at Buholen. Installation of plant for production of hydrogen peroxide is proceeding. It is estimated that the output of this plant will supply Norway's requirements.

The Nitroglycerin Co., a nitrocellulose producer, is increasing its capacity at Hurum, near Oslo. The new unit will double present production and will reduce Norway's imports of nitrocellulose.

Production of vinyl thermoplastics, Norvinyl, by Norsk Hydro, is to be increased from 2,500 tons to 5,000 tons a year. This expansion has been deemed necessary by the growing consumption of plastics materials, particularly the manufacture of water pipes and insulators and other materials used in electrical work.

Norsk Hydro are to set up, also, a new plant to produce calcium carbide. This will have a capacity of about 30,000 tons a year and will function with a new Norwegian arc furnace, eliminating smoke fumes.

The three Norwegian state societies have concluded an agreement by which they are to exploit a pyrites deposit near Trondheim. The size of the deposit has been estimated at about 1.5 million tons. Extraction is expected to be about 100,000 tons a year. The investment necessary for this exploitation is of the order of 15 million Norwegian crowns.

Israel To Manufacture Anti-Knock Compound

Patent rights in the manufacture of ethylene dye bromide have been acquired by the Dead Sea bromine works. It is planned to produce 1,800 tons annually of this anti-knock petrol additive.

Petroleum Products Improved By Radioactive Wastes

To improve petroleum products, Sinclair Refinery, Chicago, US, is using radioactive wastes from an Idaho atomic reactor. Investigations are being carried out at Sinclair's new \$375,000 tracer laboratory, which is stated to be the first US research laboratory in the US to use fuel elements from an atomic reactor as its radiation source.

The company believes that it can find applications in its research on petroleum products that will enable 'waste' materials from reactors to be used practically. At the present time, the research work is concerned with producing refinery products in large volume at low cost with improved quality.

It is reported that the Sinclair Refinery have produced a floor wax which is said to have a longer lasting life and higher

gloss as a result of radiation treatment compared with untreated types.

Export Opportunities

Chemicals required for the Belgian Congo comprise 10,000 kg. of caustic soda in flakes, 5,000 kg. of ferro-silicate in fine flakes and 5,000 kg. of aluminium in grains, to an estimated value of B.Frs.600,000. Copies of the specification (No. 80) may be obtained from the Service des approvisionnements du Ministère des Colonies, 1, rue de la Régence, Brussels, against prepayment of B.Frs.50. Closing date for bids is 12 June.

The Indian Government is seeking supplies under ICA procurement (No. 86-51-009-6-60408) of a wide range of laboratory glassware. Documents can be obtained from the India Store Department, Bromyard Avenue, London W3. Closing date for bids, which should be sent to the India Supply Mission, 2536 Massachusetts Avenue NW, Washington 8, DC, US, is 6 June.

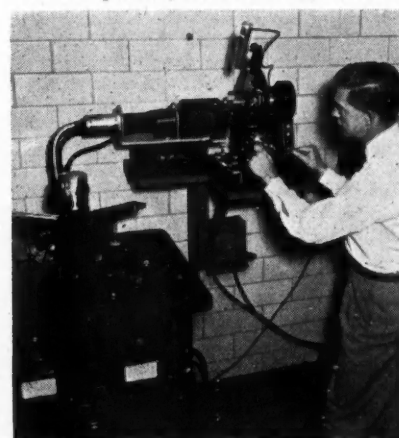
Sulphuric Acid Plant for Southern Rhodesia

A sum of £3 million is being invested in a sulphuric acid and superphosphate plant in Salisbury. Production of sulphuric acid should start by the end of next year followed shortly after by the superphosphates.

Oil Analysis by Geiger Counter

Scientists of the Sinclair Research Laboratories in the US are using a Geiger counter combination with X-ray spectrograph to control manufacturing and assure optimum quality of up-to-date lubricating oils.

In the process, more than 50,000 volts



Using the Geiger counter/X-ray spectrograph apparatus

are required to produce X-rays which bombard samples of lubricating oils and excite fluorescent X-radiation characteristics of atoms in the samples. The wave lengths of the fluorescent X-rays are characteristics of the atoms and the intensity of each wave length is proportional to the number of the particular atoms in each sample.

To avoid deviation from a direct path, due to atmospheric interference, X-rays are passed through a guided path of helium. A single crystal of rock salt serves to resolve the fluorescent X-rays into various wave lengths. The Geiger counter measures the wave lengths present to identify the atoms and determines the intensity of each wave length to ascertain the quantity of specific atoms present.

This new method provides a rapid and accurate substitute for the slower chemical methods. Analyses which formerly required hours are now made in a matter of minutes.

ICI Australia Investigates Bauxite Deposits Chemical Needs

The supply of chemicals for the recently discovered bauxite deposits at Weipa, on Cape York Peninsular, Northern Queensland is being investigated by Imperial Chemical Industries of Australia and New Zealand. Technical director, Mr. L. W. Weichardt has recently returned from the area. The chemicals would be required in the production of aluminium from the bauxite deposits which are being developed by Consolidated Zinc.

Israel's Refinery Hopes Based On Elath Pipeline

Israel hopes that the oil pipeline from Elath will ensure full operation of the refineries in Haifa, which have a capacity of 4 million tons a year. At the present time, these are operating at 25 per cent of capacity only.

Near the refineries will be erected various petrochemical works which will provide Israel industry with many of the raw materials imported today from abroad.

Manganese Sulphate From Indian Ores

A process for the production of manganese sulphate monohydrate of 93.6 per cent purity from manganese ores has been developed by the Central Electro-Chemical Research Institute, Karaikudi. Conditions of working standardised on the basis of batches of 20 to 30 lb. of manganese sulphate have also been developed.

The process involves in the main mixing the ore with a reducing agent (charcoal or coke), roasting the mixture at a moderately high temperature, followed by leaching of the calcine with dilute sulphuric acid. The leach liquor, after removal of impurities, is concentrated to saturation when crystals of manganese sulphate separate out. Recovery is stated to be about 60 per cent and the product obtained is claimed to be totally soluble in water.

Parties interested in undertaking the

commercial development of the process are invited to correspond with the secretary, National Research Development Corporation of India, Mandi House, Lytton Road, New Delhi 1.

Ample resources of manganese ores are available in India and most of the available grades including precipitated hydrated manganese dioxide can be used.

Brazil's Chemical Output Up

Production in the basic chemical industry of Brazil in 1956 showed some notable advances over the previous year. Output of caustic soda reached 50,000 tons (31,000 in 1955); wood pulp 109,500 tons (74,000 tons); super-phosphate 180,000 tons (97,000 tons); asphalt 56,000 tons (16,000 tons); rayon 42,000 tons and synthetic resins 25,000 tons (11,000 tons).

US Nickel Development

A nickel and cobalt refining plant is planned near Braithwaite, Louisiana by the Freeport Sulphur Co. Capacity of nickel is planned at 50 million lb. a year; that of cobalt will be 4.4 million lb. a year. It is expected that US output of nickel will be quadrupled by this development.

Australian Titanium Oxide

Australian Titan Products Proprietary at Burnie, Tasmania is to expand greatly production of titanium oxide pigment. British Titan Products, the parent company, is to provide most of the capital for the expansion scheme.

Teflon Superior to Mica for Capacitors

US Air Force-sponsored research which indicated still another use for versatile Teflon—this one in electronics, where capacitors of the polytetrafluoroethylene material were found superior to those of mica—is described in a report just released to industry through the Office of Technical Services, US Department of Commerce.

Teflon met all requirements for replacement of mica capacitors under temperatures from minus 60° to 200°C. The single exception was r-f current rating, which could not be applied to metal-cased units because of overheating.

The summary report, PB111729 *Development of Subminiature High Temperature Capacitors*, may be ordered from OTS, US Department of Commerce, Washington 25. It contains 79 pages, price \$2.

Fullers' Earth Deposits in Hyderabad

Detailed prospecting of deposits of Fullers' earth in Gulharg District of the former State of Hyderabad has revealed that they contain a reserve of about 164,000 tons. Deposits at Korvi alone may account for more than one lakh tons.

Tests conducted at the Central Laboratories for Scientific and Industrial Re-

search have shown that the material is of fairly good quality. The Korvi samples appear to be comparatively good, it is stated and could be worked to advantage.

Australian Wool 'Deburring' Process

An improved process for 'deburring' wool has been perfected by the Commonwealth Scientific Industrial Organisation. Detergents are added to sulphuric acid in which the wool is baked to carbonise vegetable matter. Cleaning process used previously involved the loss of nine per cent of 'burred' wool. The new process allows an additional 5 per cent of processed wool to be recovered clean. Cost of the detergent used is small.

Bid to Make Goodrich's Rubber Process Public

A suit in court has been filed by the US Government to compel the B. F. Goodrich Co. to disclose details of the process by which the company claims it can make synthetic rubber with chemical qualities the same as natural rubber. The Government claims that the Goodrich Co. received more than \$1.7 million of Government money between 1949 and 1955 for the purpose of developing synthetic rubber. The company was to disclose any new processes to the US Government.

Nuclear Purity Zirconium By German Company

The German chemical engineering company, Degussa, is now able to sell on a commercial scale zirconium of nuclear purity and arc-furnaces for the smelting of zirconium, canned fuel elements for gas-cooled and water-cooled reactors, pure uranium and equipment for the reduction of uranium ores of nuclear quality.

'J' Series Added to Poly-Tergent Detergents

A new 'J' series has been added to the Poly-Tergent line of non-ionic surface active agents introduced earlier this year by the industrial chemicals division of Olin Mathieson Chemical Corporation, Baltimore, Md. Outstanding characteristic of the new series is the wide temperature range over which the products are effective. Extending from 0° to 100°C (−32° to 212°F), this range is greater than that available through most other large volume non-ionics. One member of the series, Poly-Tergent J-500, can be used at the boiling point of water without serious loss of its surfactant properties.

The J series consists of four products of ascending molecular weights. All are aliphatic polyoxethylene ether alcohols. Good wetting, detergent and dispersant properties are claimed for this new series.

Poly-Tergents J-300, J-400, and J-500 can be used effectively in the preparation of detergent-sanitisers, soluble oils, metal cleaners and water paints. All are suitable for use in acid pickling and oil well acidising operations. J-500 will break many types of crude petroleum oil emulsions and can be combined in various

ratios with J-200 to give stable oil-in-water emulsions.

The comparatively high stability of the J series surfactants to acids and strong alkalis is said to make these products useful where less stable products often fail, as in acid steeping operations, alkaline boils, rayon coagulating baths, wool carbonising, antiperspirant creams and lotions, and even in some types of chemical intermediate production.

Indian Standard Specification for Sodium Nitrate

Requirements and methods of test for sodium nitrate, technical, have been published in an Indian standard specification by the Indian Standards Institution's fine chemicals (organic and inorganic) sectional committee together with representatives of the Indian Chemical Manufacturers' Association, Council of Scientific and Industrial Research, Government technical bodies etc. The standard, IS 879-1956, is priced Rs1-8-0 and can be obtained from the Indian Standards Institution, 19 University Road, Delhi 8, India.

Cryogenic Conference Planned at NBS, Colorado

The 1957 Cryogenic Engineering Conference will be held on 19, 20 and 21 August at the US National Bureau of Standards, Boulder, Colorado, US. The following topics are planned:

- (a) Cryogenic process — liquefaction cycles, purification of gases, distillation, fluid flow, catalysis
- (b) Cryogenic equipment—dewars, pumps, expansion engines, heat exchangers
- (c) Cryogenic properties — mechanical, electrical, thermal, vacuum insulation, powder insulation
- (d) Cryogenic applications — expansion engines and turbines, cryogenic fuels and oxidants, bubble chambers.

Delegates planning to present papers must send abstracts (not over 200 words) by 1 June. Papers presented should deal only with the technical aspects of cryogenic engineering in the field below 150° K (−190°F).

Further information may be obtained from K. D. Timmerhaus, Secretary, 1957 Cryogenic Engineering Conference, Department of Chemical Engineering, University of Colorado, Boulder, Colorado, US.

US to Increase Rubber Products

Millions of dollars are being invested by US rubber companies, including the largest synthetic producers, to increase natural rubber output in Sumatra, Malaya, Liberia, Brazil and elsewhere according to the *New York Sunday Times*, 12 May.

Many thousands of acres are being replanted, and plantations and scientists are experimenting with chemical tree hormones which have been said to increase white rubber latex yields by 25 to 40 per cent (see *CHEMICAL AGE*, 2 March, 368). By increasing natural rubber supply, the cost of producing more from the same acreage and using the same number of employees, is reduced.

BULK MATERIALS HANDLING FOR SMALL CHEMICAL FIRMS

First UK Demonstration of Tote System

A NEW handling system, said to give small- and medium-sized chemical firms the advantages of bulk materials handling, had its first demonstration in this country at the new factory of Winthrop Laboratories Ltd., Newcastle-upon-Tyne, last week. This is the first installation of the Tote system, made by Pressoturn Ltd., Leam Terrace, Leamington Spa, Warwick, under licence from Tote Systems Inc., Beatrice, Nebraska. Pressoturn hold the world distribution rights, outside the US and Canada.

Designed to provide greater efficiency and profit for any industry using powdered, granular or liquid materials, the system enables bulk handling methods to be applied to these materials throughout the whole production cycle. The system eliminates the expense of providing, and constantly replacing, expendable containers, and enables storage space to be used to maximum capacity. It also protects the product.

Details of System

The system consists of the Tote aluminium alloy bin, the Tote spinner head unit and the Tote jolter, designed to ensure full capacity loading of fine powders, and the Tote tilt discharger, which tilts the loaded bin to the required angle for discharging into any production or processing equipment.

Designed for easy handling by stillage or pallet truck, overhead crane, or fork lift truck, the bin is made in three standard sizes: 42 cu. ft., 74 cu. ft., and 110 cu. ft. capacities. For each size of bin the standard filling aperture is nine inches diameter, and the discharge door 34 in. by 14½ in.

Speaking at a dinner following the demonstration, Mr. Arthur H. Cooke, director and general manager, Pressoturn Ltd., said the system could be installed in a factory for as little as £300. This price would include the purchase of such ancillary equipment as an overhead crane, a loading ramp, or a pallet or fork lift truck, and the hire, at a nominal sum, of two Tote bins and a tilt.

The small firm, said Mr. Cooke, would thus be in a position to take advantage of bulk discounts and to enjoy the benefits of operating a bulk handling system. Several different qualities or blends of material could be transported at the same time. Any flat-bed vehicle could be used for carrying the bins.

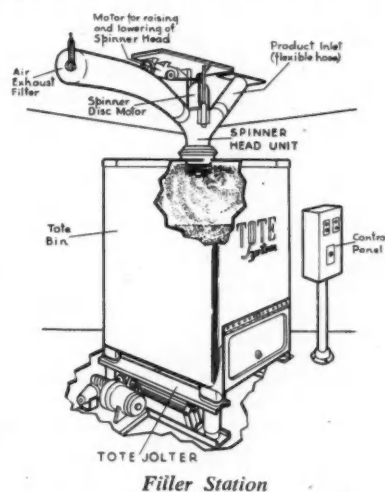
Tote bins can be filled by standard equipment used for filling sacks, barrels or boxes. No fixed structures are necessary for storage. Use of the bins is said to save 25 per cent of the space usually required for bulk materials storage without the necessity of employing double-stacking. Tote bins can be double-stacked where ceiling heights permit.

A comparison of the area required for

the storage of 22,400 lb. sugar shows that paper sacks require floor area of 124 sq. ft., bulk hopper 98 sq. ft., liquid tank 100 sq. ft., and Tote system 84 sq. ft. Paper sacks require 702 cu. ft., bulk hopper 955 cu. ft., liquid tank 900 cu. ft., and Tote system 483 cu. ft.

Products subject to contamination, deterioration or damage from outside elements are protected by specially designed gaskets and fasteners that exclude ingress of impurities and contamination, prevent loss of material from the bin, and retain the original moisture content of the material. The use of aluminium for the bins makes them suitable for handling many corrosive materials.

The Tote system is designed to handle fine chemicals, detergent, explosives, fluorescent powders, plastics powders, flour, carbon-black, soap, soya-bean



meal, sugar, cake mixes, salt, cement, coffee, whiting, liquid sugar, oils, paint, and lacquer.

With most granular materials nothing more than a simple filling spout is needed. With very fine powdered materials a Tote spinner head and jolter can be employed during filling. The spinner head throws the material to the sides of the bin forming a level load. The jolter vibrates the bin once every three seconds during filling to ensure capacity packing. Where required batch-weighing devices can be incorporated in the filling equipment.

After filling, the bins can be sealed and the content weight and quality recorded on a tally-card positioned on the discharge door. Where a single commodity forms the complete load and filling arrangements are suitable the bins can be filled without removal from the vehicle.

Transport of the Tote bins from supplier to user can be by rail or road vehicle. Fork lift or pallet trucks are normally used for movement in the plant or between the plant and the vehicle or railway dock. The bins fitted with



Tote bins being stacked in raw materials storage section by fork lift truck

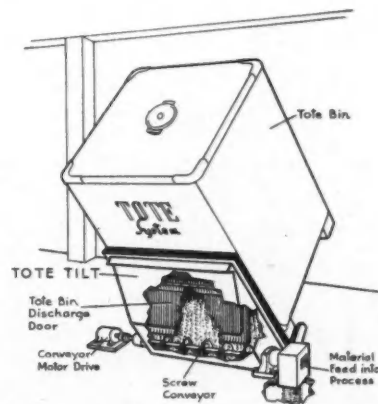
corner lifting lugs can be handled by standard lifting tackle.

Transfer of filled bins from stores to road vehicles, and from road vehicles to receiving depots can be carried out speedily. The time taken to unload bagged sugar, for example, from a six-ton vehicle, is three man hours, while the time taken to unload the same amount of sugar, when contained in six bins, is eight minutes.

Contents of the bin are discharged automatically by use of the Tote tilt. The bins are positioned on the tilt by fork lift or pallet truck or by overhead crane.

When the bin is in position and has been inclined by the tilt unit to an angle of 45°, a key is inserted through the tilt unit hopper and the discharge door opened, allowing the material to flow. During the whole operation specially designed gaskets ensure that no sifting or blow-back occurs.

Gravity type tilt units are used where the material is free flowing into the process. Screw type tilt units are used where the material is required at the same level of discharge as the tilt. The screw type can be coupled to any form of conveyor or elevator if required. Vibrator units can be fitted to both gravity and screw type tilt units to ensure complete discharge of fine powders.



Discharge point in Tote system. Tilt unit is fitted with screw conveyor



Monsanto Products Listed

A list of the products of Monsanto Chemical Co. has recently been published under the title 'Monsanto Chemicals and Plastics'. Materials are listed alphabetically and short notes are included which give details of physical properties, suggested uses and available literature. The booklet also includes a list of industries served by Monsanto, with the products they use.

Filtration with Terylene

Uses of Terylene as a filtration agent are discussed in a booklet 'Terylene for filtration' published by Imperial Chemical Industries. Advantages claimed for Terylene are that fabrics can be specially designed to suit a particular filtration and existing filter cloths can be matched in Terylene to give identical or better performance but with longer life. It is claimed that Terylene can last at least five times as long as its natural counterparts. Other advantages claimed are greater chemical resistance and ease of sterilisation.

BISRA Investigations on Painting of Steel

Results of investigations of the protective coatings (corrosion) sub-committee of the British Iron and Steel Research Association are contained in 'Protective Painting of Structural Steel' by Fancutt and Hudson, published by Chapman and Hall, price 21s. Three main factors govern the success or failure of painting. They are: surface preparation, choice of painting scheme and painting procedure. The sub-committee's researches show that the first of these is the most important. The most practicable methods of cleaning are pickling or gritblasting. Choice of paints is discussed and the minimum film thickness for adequate protection is stated. A standard scale showing various degrees of paint breakdown is included. This is intended to serve as a guide in deciding when to repaint.

Booklet Describes Radiation Precautions

Advice on the handling of X-ray equipment and gamma-ray sources is given in 'X- and Gamma-ray Safety Precautions' published by the British Welding Research Association, 29 Park Crescent, London W1, price 2s.

The book emphasises that radioactive materials present hazards no worse than many other industrial substances, but their danger is not so obvious. Since there is no direct sense to warn of radioactivity a special procedure has to be used to avoid inadvertent exposure to

gamma-rays. The use of film badges and dosimeters is described. Film badges suffer from the disadvantage that they do not give an immediate reading of the dose.

Most satisfactory type of instrument is said to be the electrometer dosimeter, by means of which the operator can check for himself the dose he has received. It is recommended that two be carried, one in the trouser pocket and one on the wrist.

Precautions to be taken when handling radioactive isotopes are described. When transporting them by road the container should be placed as far as possible away from the driver and warning notices should be prominently displayed indicating what action should be taken in case of accident.

Straight Through Diaphragm Valve

Technical bulletin D4 published by Wynn (Valves) Ltd., Granville Street, Birmingham, contains technical details of the straight through diaphragm valve which will be generally available shortly. Various linings are possible including glass lead, rubber, Neoprene and plastics and there is a choice of five body materials, cast iron, stainless steel alloys, bronze alloys, aluminium alloys and Regulus metal.

Data on Magnaminium

High Duty Alloys Ltd., Slough, Bucks, have published 'Technical Data for Magnaminium and Magnesium, Zirconium and Thorium Containing Alloys,' with the object of assisting designers to select the most suitable magnaminium alloy for particular requirements. The booklet gives the physical and specified mechanical properties of these alloys.

Improving Characteristics of Molybdenum

March issue of *Alloy Metals Review*, published by High Speed Steel Alloys Ltd., Widnes, contains the second part of an article on molybdenum. The author, D. O. Pickman, Armament Research and Development Establishment, discusses oxidation resistance, properties and application. Unprotected molybdenum has very poor oxidation resistance and attempts have been made to improve its properties in this respect. Certain alloys are reported to have better oxidation resistance, but the desirable characteristics of molybdenum are lost. Oxidation resistant coatings appear to offer the best solution. Two forms of coating, molybdenum and certain ceramics, are

successful under static conditions but do not meet ductility requirements. It is believed, however, that these coatings may serve as diffusion barriers for superimposed metallic coatings.

Use of Rubber in Engineering

Proceedings of the Natural Rubber Development Board's recent conference on Rubber in Engineering have been published under the title of 'Rubber in Engineering Conference Proceedings' (160 pages, over 100 illustrations). The five papers it contains are 'Rubber must be used correctly' by W. J. S. Naunton, 'Load-deflection relations and surface strain distributions for flat rubber pads' by A. N. Gent, 'The use of rubber in heavy engineering' by S. W. Marsh, 'Dynamic fatigue life of rubber components' by P. W. Turner and 'Rubber in agriculture' by S. J. Wright. Copies of the book may be obtained free from the Natural Rubber Development Board, Market Buildings, Mark Lane, London EC3.

Chromatographic Materials and Reagent for Copper

A leaflet listing the prices of the MFC range of materials for chromatography has been published by Hopkin and Williams Ltd., Freshwater Road, Chadwell Heath, Essex. Twenty-nine substances are listed in this leaflet, including aluminium oxide in various forms, calcium carbonate, cellulose, Fullers' earth and various solvents. Hopkin and Williams have also produced a booklet describing the uses of 2:2'-diquinolyl (cuproin) in the determination of copper. This compound forms an intensely magenta-coloured complex with cuprous copper which is stable in amyl alcohol for about a week.

Pumps for Chemical and Process Industries

Two series of 'Gush' pumps, the ST and FB, are described in brochures published by Appleton and Howard Ltd., Salisbury Street, St. Helens, Lancs. Small crevices in the ST series have been reduced to a minimum and the gland drip trough is easily cleaned and washed out. It is said to be impossible for harmful vapours or liquids to attack the bearings. Regulus metal is used as the construction material for the FB series with rubber lining. They are claimed to be the lowest priced centrifugals available and to cover 110 corrosive duties.

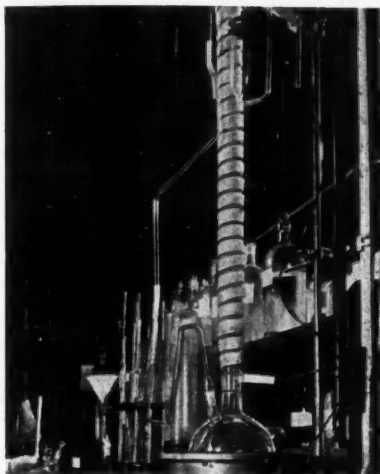
Revised Agricultural Products Brochure by Berk

A revised agricultural products brochure has been issued by F. W. Berk and Co. Ltd., PO Box No. 193, 1-19 New Oxford Street, London WC1. This is supplied as a series of loose leafs for insertion in the Berk ring binder which has been distributed to users of Berk chemicals and others. Full instructions are contained in each section of the revised brochure for the use of all the materials described.

**HEAT
BY THE
YARD**

HEATING tape which can be cut at will, 'Heat-by-the-Yard' is now being produced by Electrothermal Engineering Ltd., 270 Neville Road, London E7. A development of the company's flexible and elastic heating tapes, it enables the user to apply heat to practically any pipe, vessel, valve, etc., by cutting a suitable length of tape from the dispenser and fixing the insulated terminations.

'Heat-by-the-Yard' consists of a continuous network of resistance wires enclosed in a knitted elastic sleeve of glass



Glass column wrapped with 'Heat-by-the-yard.' Photograph by courtesy of Whiffen and Sons Ltd.

fibre yarn. It is made in $\frac{1}{2}$ in. and 1 in. overall widths. Lengths of 25 ft. or 50 ft. are supplied in a carton complete with six or 12 connectors. Electrical resistance has been arranged so that a normal working length of 12 ft. would require a voltage of 120 v. while a 23 ft. length would require 230 v. to obtain maximum temperature, i.e. the normal working voltage will be approximately 10 v. per foot length.

**BOILER
LEVEL
CONTROL**

A 'THREE-ELEMENT' drum-water-level control system is now available as an integral part of any automatic-boiler-control scheme produced by George Kent Ltd., Luton, Beds, for water-tube boilers. The company have developed the system on existing principles. It uses standard instruments and components, thereby simplifying initial commissioning, maintenance and servicing requirements.

The three elements taken into consideration by the scheme refer to the three measurements of feed-water flow, steam flow and drum water-level. The Kent system is said to have the advantage of being readily adjustable on site to match the particular operating characteristics of the boiler plant.

The scheme combines drum-water-level control with steam-flow/feed-water-flow ratio control. These controls both act by regulation of the flow feed-water, and the extent to which one predominates over the other can be adjusted to any value between pure level control and

EQUIPMENT REVIEW

Chemical Plant : Laboratory Apparatus Safety and Anti-Corrosion Products

pure flow-ratio control. Setting of this adjustment depends on the design and operating conditions of the boiler. Individual requirements of boiler plant are also catered for by the inclusion of adjustments to allow for average blow-down and for the amount by which the level tends to alter as the result of a given change in steam demand.

The system makes use of four instruments, a drum-level transmitter, a steam-flow transmitter, a feed-water-flow instrument fitted with a computing and transmitting mechanism, and level controller, which is the master instrument.

**FILM SCANNING
PARTICLE
ANALYSER**

THE film scanning particle analyser, type L188, of Mullard Ltd., Torrington Place, London WC1, is now in production. The memory system, which ensures that no particle appears twice in the final count, now incorporates one of the latest types of ultrasonic mercury delay lines, in place of the nickel line used in the prototype. The mercury line has a much wider bandwidth and therefore provides a delayed signal of greater fidelity.

Also, counting accuracy has been enhanced by the provision for scanning each frame several times, the successive counts being totalled in an electronic register and the average figure presented on the dekatron counter tubes. Another improvement is the inclusion of an alternative lens in a turret mount. This provides for supplementary counting at a higher magnification, to give greater discrimination when size ranges lie very close together.

The analyser is the subject of the latest production of the Mullard film unit. A film entitled 'Particles Count,' deals with the development, application and principle of operation of the equipment, and is available on loan.

**MEGATOR
RELIEF
VALVES**

A RANGE of new relief valves, designed specifically for handling liquids, is being introduced by Megator Pumps and Compressors Ltd., 43 Berkeley Square, London W1. The design is claimed to be an advance on any other liquid relief valve on the market.

Made of high quality bronze to BSS 1400-LG3, the valves were originally developed for use with Megator pumps, to protect the installation against excessive discharge pressure or faulty operation, but they are now available also to industry generally.

A particular feature of the valve is the introduction of a skirt to the clack, which makes the valve more positive and stable in operation. As soon as the valve begins to open the skirt presents a

greater area to take the pressure, so providing an increasing force to overcome the increasing resistance of the spring as the valve lifts. There is a small differential between the opening pressure, the pressure at which the valve will continuously discharge full capacity and the reseating pressure.

Among other unusual features of the valve are an arrangement to render more difficult any unauthorised interference with the setting, and the ease with which the spring and valve disc can be dismantled for inspection or replacement without interfering with the main pipework. Freedom of movement of the valve disc can be speedily checked by removing a single screwed cap and turning the valve spindle with a screwdriver. Another useful feature is that the valves can be dismantled and the clack and seat inspected without interfering with setting.

The valve spring is made of cadmium-plated carbon steel and is outside the main body of the valve, so that it is not in direct contact with the escaping liquid. An 'O' ring effectively prevents the escaping liquid leaking into the spring chamber.

Sizes and stock settings of the valves are as follows: one-inch size has a setting of 65 p.s.i.; one-and-a-half inch, setting 65 p.s.i.; two-inch, settings of 35, 65, 110 and 150 p.s.i.; and three-inch, settings of 65, 110 and 150 p.s.i.



Megator relief valve

PRINTED POLYSTYRENE TUBES

PRINTING on white polystyrene tubes is now being offered by the Metal Box Co. Ltd., 37 Baker Street, London W1. At present this is confined to line printing in two colours.

White tubes, but not transparent ones, can be printed in up to two colours, with a choice of orange, crimson, scarlet, black, green, turquoise, Chinese blue, deep blue and mid-red shade blue.

The tubes are tough and light and are said to be rigid enough to protect the contents against heavy pressure. A polythene stopper gives them an effective seal, but is easy to remove and replace. It is made in a number of different colours. A special stopper, known as the Pillar Pack stopper, can be supplied for tablet tubes. On the underside it has three flexible prongs which hold the contents gently in place. This does away with the need for a cotton wool plug and saves time in packing.

HILGER FLUORITE POLYCHROMATOR

FLUORITE polychromator, an instrument that automatically analyses carbon, phosphorus, and sulphur in steel, has been produced by Hilger and Watts Ltd., 98 St. Pancras Way, Camden Road, London NW1.

The instrument is a three-prism spectrograph in a drum-like container 18 in. dia. It is mounted on a cabinet housing the necessary vacuum apparatus and the measurement and control equipment. The four detectors (one for each element and one for the internal standard) are quartz-window EMI photomultipliers.

The sample is mounted in a spark-chamber through which an inert gas is circulated. It is designed so that samples can easily be changed.

Time required for an analysis, from the moment when the prepared sample is put in the spark-chamber to the instant when the contents of all three elements are known is generally under two minutes.

If the carbon content is under 0.05 per cent, a single sparking suffices for all three elements and the analysis is completed in less than two minutes. If the carbon content exceeds 0.05 per cent, it is advisable to determine the carbon separately with different source conditions, but the time taken for a complete analysis is still no more than three minutes. If carbon is the only element to be determined, the time taken is about one minute.

Excluding source unit, overall height is 62 in., length 62½ in., depth 48 in., and weight about 700 lb.

BAG SEALING ATTACHMENT

NEW PATENTED Faseal portable bag sealing attachment has been acquired by the Thames Sack and Bag Co. Ltd., Furze Street, Bow, London E3, an associate company of William Palfrey Ltd., 24 City Road, London EC1, manufacturers of Palfsacks multiwall paper sacks, and is now being marketed for the first time.

The attachment is a quick, neat and easy-to-operate unit which by means of a crepe strip fitted over the top of a fitted multiwall paper sack, is said to

ensure a perfect closure of the sack. The strip also acts as a reinforcement against the weakening effect of stitching perforations made by standard stitching machines. By incorporating a miniature guillotine, the Faseal enables the crepe and the stitching cotton to be severed simultaneously. A mirror gives the operator an unobstructed view of the entire sealing operation.

The Faseal is said to be particularly useful in cases where multiwall paper sacks are alternated with jute, cotton or other fabric sacks. When the run of paper sacks has ended, the Faseal can be put out of commission by throwing over a spring-loaded hinge. No unscrewing or dismantling is required.

FORK LIFT TRUCK

A NEW rider controlled fork lift truck has been added to their range of MR trucks by G. Hunter (London) Ltd., materials handling specialists, 80 Fen-



Tunstack Truck

church Street, London EC3. The truck has been designated the name Tunstack and is available in two capacities. One model is the TS 2, which lifts 2,240 lb. at 20 in. centres, and the other model is the TS 3, which will lift 300 lb. at 20 in. centres.

TRANSOBAND SELF-ADHESIVE TAPE

TRANSOBAND, a self-adhesive tape based on a waterproof vinyl film, to which reinforcing yarn threads are bonded, is being marketed by John Goshon and Co. Ltd., Albert Embankment, Vauxhall, London SE11. The threads are covered with a strong adhesive coating which is said to give an excellent grip to a wide range of surfaces.

Supplied in widths from ½ in. to 1 in. in increments of ¼ in., and from 1 in. upwards in increments of ¼ in., the tape has a tensile strength of 180 lb. per inch width.

The vinyl backing is designed to protect the reinforcing yarns from abrasion. When applied to a carton the reinforcing yarns are bonded to its surface and form an integral part of the pack, increasing the carton's resistance to shock and rough handling.

NEW POLYTHENE BINS

Two new lightweight, polythene Tote bins are announced by Precision Components (Barnet) Ltd., 13 Byng Road, Barnet, Herts. Claimed to be strong enough to stand up to the roughest treatment, they are designed for moving materials or components between departments, for temporary storage between operations or as returnable containers for the delivery of goods and spare parts to customers.

Tote bin TB 250 is 13 in. by 7 in. by 3½ in., and Tote bin TB300 is 17 in. by 12 in. by 8 in. Both bins are fitted with built-in index card holders.

CORROSIVE CHEMICALS PUMP

A PUMP for use with highly corrosive chemicals, in which all parts coming into contact with the fluid are made from Fluon, has been developed by Crane Packing Ltd., a Tube Investments company, of Slough, Bucks.

The Crane bellows pump can, it is claimed, handle successfully all known chemicals and solvents except fluorine and the molten alkali metals, within the temperature and pressure ranges specified. Although basically designed for handling clear fluids, the pump can also function successfully with liquids which have solids in suspension so long as they are not by nature likely to silt up the convolutions of the bellows or prevent the valves operating.

Designed mainly for use in laboratories on short term experiments, the pump provides highly corrosive liquids or gases at a predetermined pressure. It can also be used as a metering pump providing an infinitely variable flow over the delivery range. The pump is set to a predetermined pressure by a pressure reducing valve in the air supply. As a metering unit, an accuracy of -2 per cent has been consistently maintained in test runs.

The pump consists of a simple bellows made of Fluon. This is blanked off at one end, and at the other end forms a valve chest incorporating two conical seat gravity valves. Motive power is supplied by a reciprocating air motor with a fully adjustable stroke and sensitive throttle control. The pump unit is directly coupled to an extension of the piston rod. The bellows pump can be supplied in either single or double ended form: the single pump unit gives intermittent delivery, whereas the double unit will give almost continuous delivery.

Temperature range is -40°C to 80°C, and the pressure range delivery 0 to 30 p.s.i.

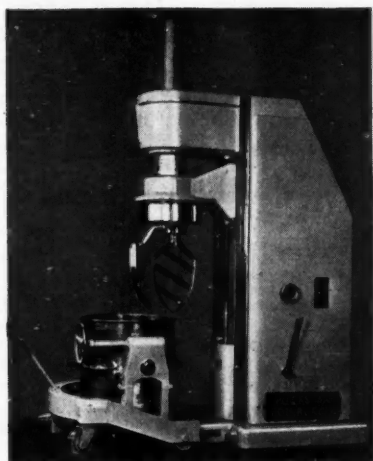
AUTOMATIC TAP CHANGER

AN AUTOMATIC tap changer (series ATC) has been produced by Claude Lyons Ltd., Valley Works, Ware Road, Hoddesdon, Herts. Described as a small, light, inexpensive and reliable electronic tap-changer, it is so designed that the output voltage always remains within ±5 per cent of the declared value, for input changes of as large as -20 per cent to +10 per cent.

Made in two basic sizes, the instrument rated at 2½ and 5 amp. when the voltage is 200-250. For 100-125 volt models, the current rating is double, i.e. 5 and 10 amp. All types are available as chassis or as complete units.

GIANT MIXING MACHINE

LATEST development in the range of vertical mixers manufactured by James Cruickshank Ltd., Duff Street, Edinburgh, is the Giant 200 quart vertical mixing machine. Designed for quantity and quality mixing of chemicals and pharmaceutical products, the machine can be provided with a bowl capacity up to 65 Imperial gallons.



Giant vertical mixing machine

The planetary head action ensures that all contents of the bowl are thoroughly incorporated and evenly distributed throughout the mixing. The planetary head with mixing equipment is mounted on slides above the bowl and is raised or lowered to position through the medium of an independent geared electric motor.

Any desired speed for the mixing implements can be obtained within the range of the 9:1 positively variable speed gear controlled by handwheel. The machine can be supplied with single or two-speed for those who do not require such exacting standards.

Design of the column has been so arranged as to allow for the complete withdrawal of the mixing equipment from the bowl thereby allowing transfer of the bowl to take place without detaching the mixing implements.

General construction of the machine is of heavy gauge steel fabrications with supplementary high grade iron and non-ferrous castings.

THREE NEW ELECTRODES

THREE new electrodes which are suitable for either a.c. or d.c. supply have been added to the range manufactured by Quasi-Arc Ltd. of Bilston, Staffs.

Ferrolloid No. 3 electrodes are a development in the 55/45 nickel-iron class. They are intended especially for strength welding of ordinary grey and special duty cast iron such as meehanite and the

nodular or spheroidised graphitic types known commercially as ductile irons. Made in 12, 10 and 8 swg in 12, 12 and 15 in. lengths respectively, they can also be used for promoting joints between such irons and mild steel or nickel-bearing materials.

Chromoid No. 4 electrodes, of particular interest to chemical engineering and oil refining industries, deposit weld metal of 18/8/3 chromium-nickel-molybdenum composition stabilised with niobium, and they conform to the requirements of ICI specification M.154G, Class E. They are made in 12, 10, 8 and 6 swg in 12 in. lengths.

Chromoid No. 5 electrodes, also said to be particularly suitable for the chemical and oil refining industries, deposit fully-austenitic stainless steel of 25/20 chromium-nickel composition, and the weld metal contains less than ½ per cent Ferrite. Made in 12, 10 and 8 swg in 12 in. lengths, they are also recommended for joining mild and stainless steels and other dissimilar steels, and for welding certain stainless clad steels, notably the Colclad series.

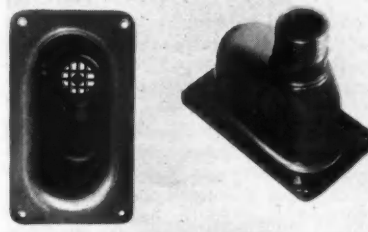
LABORATORY DRIP CUP

New design in laboratory drip cups has been produced by Turner and Brown Ltd., Davenport Street, Bolton. Press moulded from Cobex rigid p.v.c. sheet

the Turbro drip cup is said to have many advantages over conventional glazed fireclay, ebonite and polythene drip cups of the funnel design.

Easily fixed by recessing into the bench top, or screwing from the under side, it is 6½ in. by 3½ in. by 4 in. deep. Designed to accommodate one or two swan neck taps and still be fitted into normal bench service space, it provides greater protection against swirling and splashing than the standard type of drip cup.

The manufacturers state that the cup



Turbro drip cup

will withstand the effects of a wide range of chemicals, is easy to keep clean and is durable yet light in weight. A sieve is incorporated in the outlet which can be easily removed to facilitate cleaning. The outlet can be set either right or left hand on the service panel by turning the drip cup round.

New Trends in Titanium for Chemical Plant

DEVELOPMENTS in the use of titanium in chemical plant were demonstrated on the stand of Imperial Chemical Industries' metals division at the British Industries Fair.

It is now possible to line chemical plant with titanium by a spot welding process. Several examples of this were shown. Examples were also shown of valves which had been handling liquid chlorine. Corrosion was negligible.

Titanium condenser tubes are in service at present at Uskmouth power station. Although it is too early to come to any decision, an ICI spokesman said that his company were confident of the results.

Most fabrication difficulties have now been overcome and the metal is readily available in sheet and rod form.

Chemical Extract Fire

Five timber vats containing several thousand gallons of chemical extract caught fire at the works of Calder and Mersey Extract Co. Ltd., Widnes, on Friday 10 May.

The fire was confined to that section of the factory containing the dissolving vats. Immediate arrangements were made for restoring production and it was expected that by this weekend output would be normal.

Perkins CME Ltd.

The photograph of the Airmatic air-heat unit shown in our issue of 27 April, page 710, was incorrectly captioned as a steam heater. Both are being shown by Perkins CME Ltd., Derby, at the British Industries Fair.

CBMPE Mission to Visit Canada

A TECHNICAL, economic and goodwill mission sponsored by the Council of British Manufacturers of Petroleum Equipment is leaving for Canada and will rendezvous in Montreal on 25 May. Travelling from east to west they will visit Ottawa, Toronto, Sarnia, Winnipeg, Regina, Calgary, Edmonton and Vancouver where the party will break up on 19 June.

Speaking at a reception held on 9 May Mr. J. M. Storey, managing director, Dewrance and Co., leader of the mission, said that today the whole of the equipment required to build a refinery could be obtained in the UK, together with more than 80 per cent of the drilling equipment normally used.

'Whether the Canadian oil industry is aware of this great expansion it is our business to find out. . . . We are to do what all salesmen do, show our samples and try to sell them.'

Swansea Conference on Automatic Quality Measurement

Automatic measurement of quality in process plants is the subject of a conference to be held at Swansea University College from 23 to 26 September by the Society of Instrument Technology Ltd., 20 Queen Anne Street, London W1. It is hoped that the range of topics covered will include chemical quality; chromatography, mass-spectrography, pH measurement, spectroscopy, titration: physical quality, density, moisture content, refractive index, viscosity and 'consistency.'

NEW TRENDS NOTED IN REINFORCED PLASTICS

THE THIRD conference on reinforced plastics was held by the British Plastics Federation at Harrogate from 1 to 3 May, under the chairmanship of Mr. W. Andrew Baker, deputy chief development engineer (plastics) of Bristol Aircraft Ltd., and chairman of the Federation's reinforced plastics technical committee. One hundred and forty delegates attended, comprising chemists, research personnel, engineers and technicians from all branches of the industry and from user firms and government research establishments. Nineteen papers were presented and discussed.

At the closing session, Mr. Baker, reviewing points which had emerged from the discussions, mentioned that polyester resins had potentialities up to 300°C and it was evident that non-attainment of that temperature in the finished material was not due to the resin but to the finish on the glass fibre and the heat properties of the glass-resin interface. Further investigation was necessary.

Increasingly interesting results had been obtained from use of NCL 24 which showed more promise than any other finish. It was therefore recommended that further work should be done with that finish to assess fatigue performance.

Potentialities of TAC resins had been discussed and it was interesting to note that Fokkers were already in production with them in aircraft components having to work at temperatures up to 200°C.

The fields which most suited each type of resin, Mr. Baker continued, were becoming clearer. Epoxide resins appeared to have greater potentialities for high-performance stability. Polyesters had a wider field because of lower cost in appli-

cations where such a high performance is not required.

It had been shown at the conference that the properties of reinforced plastics materials opened up many applications and had indicated their many advantages in fatigue properties over metals, including even steels, when taking into account strength/weight ratio. Reinforced plastics were immensely superior to aluminium alloys particularly in 'notch' performance with stress concentrations.

Chemical resistance properties of reinforced plastics had not been exploited to any degree in relation to their potentialities. A great field was open to reinforced plastics because of their good resistance to corrosion.

It would be necessary in the future to see that satisfactory inspection standards were set, for one or two poor applications could set the whole work back and it was very evident, said Mr. Baker, that if progress was to be made it must be known what the fabricators wanted.

Mr. Baker went on to outline future action including inducements to the smaller fabricator to take full advantage of the information available; the setting up by the federation of a working committee to deal with the inquiries of fabricators and others; the drawing up of a cost pro-forma; and consideration of the medical dangers of the handling of the materials concerned.

Mention was made of two industry specifications, one for unsaturated polyester resins for low pressure laminating and the other for epoxide resin systems which are to be available in the near future.

Ayling Form Nuclear Equipment Company

A NEW ORGANISATION, known as the Ayling Nuclear Equipment Co., has been formed by the Ayling Industries Group, Horsham, Sussex, to cover the field of remote handling equipment for radioactive materials.

The new company will co-ordinate the group's production activities and will also be responsible for control of sales promotion.

The group has recently been awarded a running contract from the Atomic



The Mark III glove box made by H. and E. Lintott Ltd. which has an air filter and ejector and alternative methods of transfer through a posting bung or an internally removed bung

Energy Research Establishment, Harwell, for a further year's experimental prototype and assembly work to the extent of £30,000.

Another company in the Ayling group, H. and E. Lintott Ltd., manufactures glove boxes for handling radioactive materials. These boxes, which are made to Harwell specifications, are in three sizes. Normally fabricated in steel, they are fitted with viewing panels of $\frac{1}{4}$ in. or $\frac{1}{2}$ in. Perspex and the material is inserted or removed through a posting port or alternatively through a bung which is itself removable.

Rubber gloves used by the operator have beaded edges which are secured to the frame of the glove part by internal clamping rings to ensure a leak-proof fit.

Each box is subjected to rigid security tests by AERE inspectors before acceptance.

By-products Production Increased

Production of crude benzole increased by five per cent in the nine months ended 31 December 1956 compared with the corresponding period for 1955, says a Gas Council report. Output of crude tar increased by one per cent in the same period.

Direct Determination of Alumina

Methods for the direct determination of alumina, issued by the British Ceramic Research Association to its members, form the basis of Addendum No. 1, *Methods for the direct determination of alumina*, to BS 1902: 1957, *Methods of testing refractory materials*. These methods should in general be used in preference to the 'difference' method described in that standard.

Part 1 specifies a method for the direct determination of alumina in silica rocks, sands and silica refractories containing from 0.1 to 10 per cent alumina; and Part 2 specifies a method for the direct determination of alumina in aluminosilicate refractories and raw materials containing from 10 to 65 per cent alumina.

Addendum No. 1 to BS 1902 may be obtained from the sales branch, British Standards Institution, 2 Park Street, London W1, price 3s 6d.

BS on Electrical Properties of Plastics

BRITISH STANDARD 2782:1957, 'Methods of Testing Plastics—Part 2; Electrical properties' has been published by the British Standards Institute, 2 Park Street, London W1, price 5s.

This is the second of a series of test methods to be used by the plastics industry for assessing the quality of its products. Part 1 dealt with the effect of temperature.

Part 2 specifies tests to be applied in moulding and extrusion compounds, synthetic resins and their solutions, semi-fabricated products such as sheet, thin film, rod and tube. The tests relate to the following properties: Electric strength, volume resistivity, surface resistivity, insulation resistance, power factor, and permittivity at 50 cycles a second, at 800 to 1,600 cycles a second, at 10 kilocycles a second and at 100 megacycles a second.

Chemicals and Bills of Lading Complaint

DEMANDS by shippers and banks for excessive detail in bills of lading covering consignments for export are the subject of comment in the annual report of the Liverpool Ship Owners Association. It states: 'The practice appeared to be increasing, to demand the introduction into bills of lading of an extent of detail about the goods concerned, such as to take the bill of lading far beyond its proper descriptive function. It is no part of that function to recapitulate the details of description, quality and quantity of articles which form part of the invoice under a contract of sale and which are shipped in cases and other sealed containers.'

In one instance, a demand was made that the bill of lading should cite a variety of chemicals said to be the contents of a number of containers and, having done so, should proceed to state that another variety was not inside them. Through the British Liner Committee, advice was given to strongly resist these practices.

For Practical Results, Research Must be Large-Scale

Fisons' Symbol of Faith in Science

TO EMBARK on a worth while expansion of research is an act of faith. Below a certain level of endeavour industrial research tends to be insignificant in its impact and fails to yield results of practical value. On the other hand a fully comprehensive research programme is very expensive.

That was stated by Sir Clavering Fison, chairman of Fisons Ltd. when he opened the company's new Levington Research Station last week. (See *CHEMICAL AGE*, 11 May, page 795, for details of the laboratories.) The opening was attended by a distinguished company of about 300 guests, comprising representatives of Government, the universities and industry. The official opening was performed by Sir Alexander Todd, chairman of the Advisory Council on Scientific Policy and professor of organic chemistry at Cambridge University.

Sir Clavering said that his company in 1951 decided to step up the scale of Fisons' research activities by a large factor, confident that the resources of modern scientific method, properly applied, would reveal opportunities for improved products of manufacture and better understanding of the economics and use of fertilisers. He added, 'The creation of the Levington Station is a symbol of the company's faith in the power of systematic scientific development.'

In recent years, new techniques of granulation and improved factory design had made good progress, but as yet only small advances had been made in the application of science to the fertiliser industry.

Research Necessary

It was sometimes suggested that a good information service might be sufficient to enable one to make use of the scientific and development work done by other organisations. But only those who had themselves carried out research in a subject were qualified to judge the merits of new inventions in that field or to assimilate the 'know-how' which was inevitably involved in putting a new idea into practical use. Unless a company did research itself it was unlikely to assimilate effectively the research results of other organisations.

Thus a research organisation was a necessity, even if it did not make outstanding new discoveries itself. It was part of the intellectual background of the company's plans and activities, and gave scientific support to its products and opinions. The really difficult question was to decide on the scale of the research and on its nature.

Continuing, Sir Clavering stated 'We have here a well equipped process laboratory for conducting those chemical engineering experiments necessary for the proper design of manufacturing

plants. The actual design of chemical plant for large scale manufacture will be carried out at a development station at Bramford, near Ipswich, now being constructed.'

Research projects at Levington would be sometimes purely chemical, sometimes technological, sometimes agricultural and sometimes all three. Fisons did not wish to do research, which was more properly done elsewhere, and the company would in no sense compete with other research organisations. It was being increasingly recognised that the universities, industry and Government organisations must work together in full knowledge of each others problems if they were to get the best from the country's resources.

Agricultural Chemistry

Sir Alexander Todd said it might be argued by some that the connection between organic chemistry and the fertiliser industry was somewhat tenuous, but if so, it ought not to be. He recalled that one of the greatest figures in organic chemistry in the first half of the 19th century—Justus von Liebig—was one of the pioneers in seeking to apply chemistry to agriculture.

Until recently there had been fewer major advances in the application of science to the fertiliser industry than might have been expected. He thought there were two main reasons. Firstly, progress in plant physiology and the understanding of plant nutrition was for long extremely slow—and we were, in fact, still very short of knowledge on both matters. Secondly, and perhaps more importantly, there was a lack of pressure to do more than modify in only moderate degree the age-old empirical farming methods.

It was during this century that the real pressure had developed. The rise in agricultural production was not keeping

pace with the rise in population when viewed on a world scale. There was no need to assume we were all marching to inevitable doom, but the crisis presented both a challenge and an opportunity to the fertiliser industry. He was sure that challenge would be met, but it called for a new pitch of endeavour, particularly in the vast underdeveloped, yet potentially most rewarding, tropical and sub-tropical areas.

It was, declared Sir Alexander, only possible to apply new scientific discoveries, if industry had its own flourishing research departments. He referred to criticisms of the research associations on the grounds that only the big firms got anything out of research as unjustified. The firms which did not get results in their scientific and other efforts were those firms which, having no working scientists, were quite unable to appreciate and apply the advantages of research. That was why it was important for industry to pursue on a large scale, and consistently, a policy of research.

Dr. J. A. Storrow, director of the station, said that coming from a university he thought the outstanding feature of Levington was the gathering together of a substantial staff, provided with exceptional facilities and allowed freedom to engage in studies within very wide terms of reference.

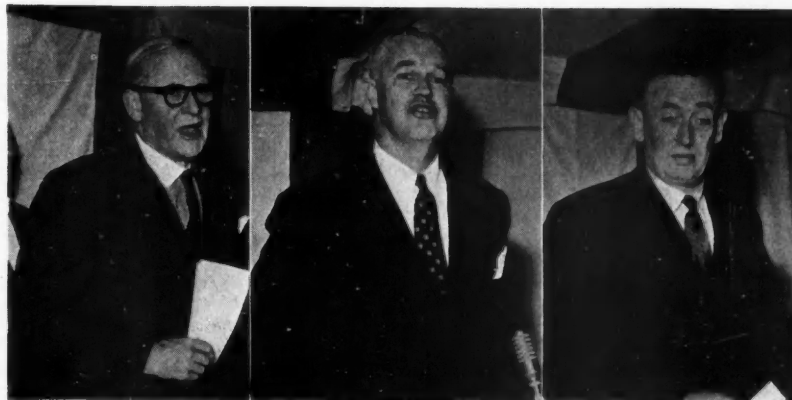
ASW Motions Call for More Pay

Motions on the agenda of the annual council of the Association of Scientific Workers, to be held in London on 18 and 19 May, call for substantial pay increases for scientific workers and for Government action to increase the supply of scientists and technologists.

The 'urgent and growing demand for more scientists and technologists,' upon which 'the economic future of the country is dependent' cannot be met, declares an executive council motion, unless salaries and prospects are improved to a level 'commensurate with their importance to the national economy.'

NPL Open Days

Open days will be held at the National Physical Laboratory, Teddington, Middlesex, on Wednesday and Thursday, 22 and 23 May, from 10.30 a.m. to 5.30 p.m.



At the opening of Fisons' new research station are, l. to r., Sir Clavering Fison, chairman, Sir Alexander Todd, who performed the opening ceremony and Dr. J. A. Storrow, head of the research station staff

● **MR. L. W. BLUNDELL**, controller of by products, North Thames Gas Board, was re-elected president of the National Benzole and Allied Products Association at the annual meeting. **MR. H. H. BATES**, chairman and managing director, Benzole Producers Ltd., was re-elected vice-president, and the executive committee was elected as follows: **DR. M. BARASH** (East Midlands Gas Board), **MR. J. COLLIGON** (Dorman, Long (Chemicals) Ltd.), **MR. C. M. FRITH** (South Yorkshire Chemical Works Ltd.), **MR. R. T. HAYES** (United Coke and Chemicals Co. Ltd.), **MR. F. A. JACKMAN** (Carless, Capel and Leonard Ltd.), **MR. C. J. JOHNSON** (North Thames Gas Board), **MR. J. E. JONES** (South Eastern Gas Board), **MR. M. PAGE** (National Coal Board, Durham Division), **MR. W. A. ROBINSON** (Midland Tar Distillers Ltd.), **MR. A. SLATER** (Staveley Iron and Chemical Co. Ltd.), **MR. A. K. STEEL** (National Coal Board), **MR. J. B. VICKERS** (Yorkshire Tar Distillers Ltd.).

● **MR. G. S. BACHE**, joint managing director of Reichhold Chemicals Ltd., Edwards Lane, Speke, Liverpool, was re-elected president of the British Chemical and Dyestuffs Traders' Association held in London last week. Other officers elected were: vice-presidents: **C. W. LOVEGROVE** and **H. GILLIAT**; chairman, **C. F. V. BLAGDEN**; vice-chairman, **D. F. WAUGH**; hon. treasurer, **K. WILLIAMS**; executive council, **C. FOUNTAIN** (Jensen, Lawson and Co. Ltd.); **L. S. HESKINS** (R. W. Greeff and Co. Ltd.); **B. B. KEEGAN** (Keegan Dyestuffs and Chemicals Ltd.); **IAN D. ORR** (James Miller Son and Co. Ltd.); **H. R. PETERS** (J. M. Steel and Co. Ltd.); hon. auditor, **R. HEAP**.

● **MR. WILLIAM STANLEY WOOD**, B.Sc., F.R.I.C., M.I.Chem.E., director, Laporte Chemicals Ltd., was elected chairman of the London Section of the Society of Chemical Industry on 6 May. Mr. Wood succeeds **SIR CHARLES DODDS**, M.V.O., D.Sc., F.R.S. He has served on the committee of the London Section since 1947 and has been treasurer since 1950. **DR. R. E. BOWMAN**, Ph.D., B.Sc., A.R.I.C., and **DR. R. J. WICKER**, B.Sc., F.R.I.C., were elected joint honorary secretaries, and **MR. E. G. PEPIATT**, B.Sc., A.R.C.S., F.R.I.C., was elected honorary treasurer.



William S. Wood

● The War Office and Ministry of Supply announce that the following have been awarded civilian studentships, tenable for three years, at the Royal Military College of Science, Shrivenham: **J. H. GARVIE**, Glasgow Academy; **G. H. GREGG**, Cockburn High School, Leeds; **D. A. G. PEDDER**, Admiralty; and **K. R. THOMAS**, Redruth County Grammar School. This studentship scheme is sponsored by the Ministry of Supply on behalf of all Government departments em-

People in the NEWS

ploying scientists. Its object is to give to young men who intend entering the Scientific Civil Service a university education in science or engineering. On the courses at the Royal Military College of Science students are prepared for the London University degree of B.Sc. (Special) in chemistry, physics or mathematics or B.Sc. (Engineering).

● **DR. RAY CAMPBELL**, B.Sc., M.Sc., Ph.D., associate research manager, ICI fibres division, has been appointed manager (chemical products) operating department, Nobel division, and **DR. GEORGE BRYCE**, B.Sc., Ph.D., work study manager, Wilton Works, has been appointed manager (explosives products) operating department, Nobel division. Dr. Campbell took up his post on 23 April and Dr. Bryce is expected to take up his post in July.

● **MR. B. C. HUGHES**, O.B.E., chairman and managing director, Hughes and Hughes Ltd., chemical manufacturers, London, left Southampton on board the *Queen Elizabeth* on 9 May to visit the U.S.

● In order to devote more time to his other commercial interests, **MR. P. R. V. WHEELER** has resigned from the board of Gas Purification and Chemical Co.

● **MR. JOHN M. OLIN**, chairman of the board of Olin Mathieson Chemical Corporation, 460 Park Avenue, New York 22, US, has become chairman of the financial and operating policy committee and continues as chairman of the executive committee. **MR. THOMAS S. NICHOLS**, president, has been appointed chairman of the board and **MR. STANLEY DE J. OSBORNE** has become president. Mr. Olin became president of Olin Industries on its formation in 1944 and in 1953 when that company joined with Mathieson Chemical to form Olin Mathieson was elected chairman of the board. Mr. Nichols, who began his career with E. I. du Pont de Nemours, was president and chairman of Mathieson Chemical and has served as president of Olin Mathieson since the company's formation. Mr. Osborne, who directs the

company's international division, is also a director of Petroleum, Belgium; Iquinos, Spain; and Fria, French Guinea.

● **MR. H. BRUCE WILLIAMS**, overseas textile representative for Chemstrand Corp. since August 1955, has been appointed manager of the technical sales office in Manchester of Chemstrand Ltd. His headquarters are the Chemstrand office at 222 Royal Exchange, Manchester 2.

● **PROFESSOR ROBERT MONNET**, professor of materia medica and pharmacology in the University of Nantes, and **MME. ROSINE BERNARD-FAUGOUIN** from the Gay-Lussac Institute, Paris, arrived in this country on Sunday 12 May on a week's lecture tour. The previous week **DR. L. SAUNDERS**, lecturer in pharmaceutical chemistry at London University's School of Pharmacy, and **MISS MARY BURR**, Nottingham woman pharmacist and member of the Pharmaceutical Society's Council, read papers to pharmacists in Montpellier, Clermont-Ferrand and Bordeaux.

● **Shell Chemical Co.** have appointed **MR. A. D. BUCKLAND-NICKS** as industrial field sales controller. He will supervise the operation of all the sales divisions and will act, when necessary, as deputy for **MR. P. J. MARCH**, the new marketing manager (industrial). Mr. Buckland-Nicks was formerly Shell Chemical's southern regional manager. The former



Mr. R. A. Atkinson (left) and Mr. A. D. Buckland-Nicks

northern regional manager, **MR. R. A. ATKINSON**, has taken up a senior position with the chemical industry administration of the Shell Petroleum Co. The posts of northern and southern regional managers will cease to operate.

● **MR. IAN LIDDINGTON**, M.C., A.C.A., who joined the Fullers' Earth Union Ltd., Nutfield Road, Redhill, Surrey, as an accountant in 1948, has been appointed a director. He served in the Army from 1939 to 1946, spending 4½ years in South East Asia.

● **DR. B. RAISTRICK**, research director of Scottish Agricultural Industries Ltd., Leith, was elected president of the Fertiliser Society at the annual meeting held recently at King's Lynn, Norfolk. **DR. E. M. REID** was elected vice-president and **MR. R. J. BRODIE**, **DR. T. K. HANSON**, **MR. S. J. PORTER** and **DR. H. L. RICHARDSON** were elected to fill vacancies on the council.

Commercial News

Borax Shares Rise on Listing of US Subsidiary

ON MONDAY, shares of Borax (Holdings) rose by 2s 1½d to 31s 10½d following a sharp increase in the New York price of its subsidiary, US Borax and Chemical, on reports that the US company's \$1 common will shortly be listed on Wall Street's 'big board.' It is understood that formal acceptance of the company's application has been received and that dealings will begin next Monday. The listing means that US Borax will now become eligible stock for a wide range of US investors, such as trustees for whom it has previously been barred. It will also now be possible to deal in US Borax in London under rule 163 (i) (e). Borax (Holdings) owns just over 74 per cent of the US equity. Present value set on it by New York is the equivalent of about 35s per Borax (Holdings) share.

Boots Pure Drug Co. Ltd.

Group profits before tax, for Boots Pure Drug Co. for the year ended 31 March 1957 were £4,754,998 compared with £4,390,637 for the previous year. Net profit after all charges, including tax, was £1,994,377 (£1,736,015). Interim dividend was 6 per cent (6 per cent) and final dividend 10 per cent (8 per cent) making a total of 16 per cent (14 per cent) for the year.

British Thermostat Co.

Dividend by British Thermostat Co., is being maintained at 25 per cent, less tax, on the £480,000 ordinary capital with an unchanged final of 17½ per cent. Group net profit for the year ending 31 January 1957 is £295,354 (£321,290 in 1955-56). Depreciation, including experimental work on machinery written off, is £16,174 (£11,576). Tax is £327,770 (£333,834).

Commercial Plastics Ltd.

Three new marketing subsidiaries have been formed by Commercial Plastics Ltd. These are: Commercial Plastics (Sales), responsible for the sale of Fablon p.v.c. light film and Superlon heavy sheet; Fablon, responsible for the sale of all consumer products such as Fabrilon polythene tablecloths, Fablonette p.v.c. tablecloths, Fablon self-adhesive decorative film and p.v.c. curtaining; Iridon, responsible for the sale of rigid thermoplastic sheeting such as high impact polystyrene and polythene, including low pressure grades, developed for the vacuum-forming industry.

BX Plastics

General financial position of BX Plastics has improved said Mr. C. F. Merriam, chairman of British Xylonite

Co. Ltd., in his annual statement. Successful efforts were made to reduce costs and increase efficiency, and the last six months of the year showed a great improvement. The polystyrene polymerisation plant had been a great success, its outstanding features being low capital cost, competitive production cost, and high product quality.

Further efforts on research were necessary to maintain the company's effectiveness, and increased laboratory facilities were included in this year's programme. A small laboratory had been installed for the study of radiation from radioactive sources as a means of producing new types of plastics materials.

Courtaulds/Celanese Merger

Shareholders have now received the formal offer by Courtaulds to acquire the capital of British Celanese. An extraordinary meeting has been called for 6 June by Courtaulds in order to carry out the share exchange proposals and to provide a margin of authorised ordinary capital for contingencies. If the offers are accepted in full, issued capital will be £70,730,249, including £53,217,749 ordinary, out of authorised capital of £82,572,500 (£65 million ordinary).

The directors of British Celanese have disclosed that they have no interest in Courtaulds' share capital apart from very small holdings in ordinary and preference stocks and as trustees of the Celanese provident fund. Courtaulds' directors have no interest in share capital of Celanese. However, they are interested between them in a total of £50,510 5 per cent cumulative first preference stock and £420,361 ordinary Courtaulds' stock.

Dunlop's Profit Down

Dunlop's group trading balance for last year was £15,094,662 (£17,508,519), and net profit totalled £3,535,216 (£5,057,560). Final dividend on ordinary is 7½ per cent, making 10 per cent (14 per cent).

Greeff-Chemicals Holdings

Group profit of Greeff-Chemicals Holdings for 1956 was £128,034 (£137,736) less tax of £63,375 (£69,839). Final Ordinary dividend of 11 per cent is declared making 16 per cent (same, with interim 5 per cent on smaller capital). Carry forward is £20,572 (£20,866). Annual meeting will be held on 27 June.

Tube Investments

A new subsidiary company, TI Nuclear Engineering Ltd., has been formed by Tube Investments Ltd. to assist its operating companies that are concerned

with activities in the atomic energy industry to promote business at home and abroad.

In association with the Tube Investments Research Laboratories at Cambridge, and its technological centre at Walsall, the new company also offers outside organisations sponsored research and design work, and radiation facilities. Head office of the new company will be at The Adelphi, London WC2.

International Nickel

Interim report of the International Nickel Co. Canada, Ltd., and subsidiaries for the three months ended 31 March, shows net earnings of US \$23,504,000 after all charges, depreciation, depletion, taxes etc., equivalent to \$1.61 per share.

L'Air Liquide

Manufacturers of oxygen and acetylene, L'Air Liquide, report gross profits for 1956 of Frs.3,949 million (Frs.3,525 million) including Frs.3,542 million on trading account (Frs. 3,145 million) and Frs.323 million from investments (Frs. 265 million). Net profit was Frs.1,659 million (Frs.1,622).

Olin Mathieson

Olin Mathieson Chemical Corp. has reported first quarter sales in the US and Canada of \$135,479,249 and net income in this period of \$10,009,979, compared with sales of \$144,340,677 and net income of \$10,080,099 in the first quarter of 1956.

Reduction in sales of approximately six per cent in the first quarter of this year is attributed principally to the sharp decline in the price of copper from the record high of the first quarter last year. This resulted in correspondingly lower prices for the corporation's brass and brass products. In addition, first quarter sales this year do not include sales of the Lenthier division which was sold in September 1956.

NEW COMPANIES

BEADLE, ROBERTS & CO. LTD. Capital £4,000. To acquire the business of manufacturing chemists carried on by Voltas Ltd. at Southall; and to carry on the business of manufacturers of and dealers in wax and other polishes, etc. Directors: Percy S. H. Leafe, George Brittain, William W. Beadle and Bertram O. Roberts. Registered office: Gem Works, The Green, Southall, Middx.

INCREASE OF CAPITAL

R. A. CRIPPS AND SON LTD., manufacturing chemists, etc., The Laboratory, Davigdor Road, Hove, increased by £300, in 1s ordinary shares, beyond the registered capital of £10,000.

HILLS AND SONS LTD., soap manufacturers, etc., 1 Frensham Street, London SE8, increased by £9,950, beyond the registered capital of £58,000.

MANCHESTER CHEMICAL CO. LTD., 4 Marsden Square, Market Street, Manchester, increased by £90,000 beyond the registered capital of £50,000.

BRADFORD CHEMICAL CO. LTD., 61 North Parade, Bradford, increased by £15,000, in 1s ordinary shares, beyond the registered capital of £10,000.

Bush House, Aldwych, London WC2, increased by £5,000,000 beyond the registered capital of £100,000.

SATISFACTIONS

LEEDS CHEMICAL CLEANING WORKS LTD., Bradford. Satisfactions 12 April, of charge registered 21 May 1949 to the extent of £750 (and that 61 Church Street, Runcorn, has been released from the charge).

MORTGAGES & CHARGES

A. J. W. (INSTRUMENTS) LTD., Horley, scientific instrument makers, etc. 9 April, £3,500 deb., to A. J. Walter, Horley; general charge.

MELWOOD THERMOPLASTICS LTD., London EC. 18 March £6,500 charge, to W. Cowan, Harpenden, and another; charged on factory premises at Ox Lane and Willowby Road, Harpenden.

PARAMOUNT PLASTIC PRODUCTS LTD., London SE. 19 March, £4,800 charge, to Orpin and Son Ltd.; charged on land at 5, 7 and 9 Anerley Station Road, Anerley.

APPOINTMENT OF RECEIVER

BEDE METAL AND CHEMICAL CO. LTD., Hebburn-on-Tyne. Mr. Joseph M. S. Coates, 31 Mosley Street, Newcastle-on-Tyne, 1, appointed receiver on 5 April 1957.

AMMONIUM SULPHATE FERTILISER PLANT SOUGHT FOR PHILIPPINES

THE National Power Corporation, 161 Bonifacio Drive, Port Area, Manila, seeks tenders for a complete electrolytic hydrogen plant capable of producing 140,000 CFH (measured at 15.5°C and 760 mm Hg.) of hydrogen suitable for the production of anhydrous ammonia and which can be subjected to a continuous overload capacity of 10 per cent or more. Minimum purity of hydrogen and oxygen produced should be 99.8 per cent and 99.5 per cent respectively. This plant is to be connected with an ammonia plant.

The ammonia plant comprises a complete nitrogen plant (air fractionation) to produce 54,000 CFH (on dry basis measured at standard condition of 15.5°C 760 mm. Hg.) of nitrogen of a minimum purity of 99.8 per cent; and a compres-

sion and ammonia synthesis plant to produce 43 metric tons daily of anhydrous ammonia, as weighed, out of the nitrogen and hydrogen gases.

A sulphuric acid plant with a daily capacity of 130 metric tons of 100 per cent as 98 per cent sulphuric acid utilising sulphur bearing ores as raw materials, is also required as is an ammonium sulphate plant to produce 150 metric tons daily of crystalline ammonium sulphate fertiliser out of anhydrous ammonia and 98 per cent sulphuric acid.

Closing date for bids is 18 June. Tender documents may be had on loan from room 805 of the Export Services Branch, Board of Trade, Lacon House, Theobalds Road, London WC1 (quoting reference ESB/11178/57).

Libyan University Men Visit UK

RECENT visitors to this country were the Rector of the University of Libya, Sayyid Mahmoud al Bishty, and the Dean Designate of the Faculty of Science, Sayyid Ahmad al Rayyis. They were arranging with the British Council for the recruitment of staff and the equipment of a new science faculty at Tripoli.

They visited science departments at London University and a polytechnic and met scientific instrument manufacturers.

Chemical Engineers' Examination

Examinations for 1957 of the Institution of Chemical Engineers will be held in London and Manchester and at centres overseas depending on the location of candidates as follows:

Part 1. Paper A, 10 September 10 a.m.-1 p.m., Paper B, 2 p.m.-5 p.m.; Paper C, 11 September 10 a.m.-1 p.m., Paper D, 2 p.m.-6 p.m.

Part 2. Paper E, 12 September 10 a.m.-1 p.m., Paper F, 2 p.m.-5 p.m.; Paper G, 13 September 10 a.m.-1 p.m., Paper H, 2 p.m.-5 p.m.

Entrance forms returnable not later than 1 June may be had from the general secretary, The Institution at 16 Belgrave Square, London SW1.

Chemical Timber Pre-treatment Would Cut Out Dry Rot

CHEMICALLY treated timber would add only 1 per cent to the cost of construction of a three-bedroom house but would repay that cost over the long term period of use in economies arising from improved resistance to dry rot and insect attacks. This was stated by Mr. Gerald Gobert of Protim Ltd. at an Edinburgh building trades meeting last week. Using a film Mr. Gobert showed the methods used in pre-treating timber advocating the toxic chemical method used by Protim, applied by means of organic solvents. Chemical treatments now available were 20 times more powerful than creosote.

Furniture beetles alone were estimated to cost the UK something like £5 million per annum, and this loss could very largely be eliminated by pretreatment.

SCI Conversazione

FISONS LTD., Felixstowe, Suffolk, were hosts at the annual conversazione of the fine chemicals group of the Society of Chemical Industry on 10 May.

The visiting scientists were shown around the Levington soil and fertiliser research station and were later entertained by Sir Clavering Fison, chairman of the Fisons group of companies.

FOR YOUR DIARY

MONDAY 20 MAY

Institute of Metal Finishing—London: Northampton Polytechnic, St. John Street, EC1, 6.15 p.m. 'Use of radio-isotopes in metal finishing research' by Dr. R. W. Cahn.

TUESDAY 21 MAY

SAC—London: Meeting room of the Chemical Society, Burlington House, Piccadilly W1, 6.30 p.m. 'Electrochemistry': 'Coulometric titrations with an integrated current source' by Dr. L. E. Smythe; 'Pulse polarography' by A. W. Gardner.

Society for Visiting Scientists—London: 5 Old Burlington Street W1, 7.30 p.m. 'Taste and smell': 'Physiology and genetics of taste and smell' by Dr. H. Kalmus; 'Experimental study of preference' by B. Babington Smith; 'Some practical aspects of taste testing' by W. J. Gleeson.

Society for Water Treatment & Examination—London: Caxton Hall, Westminster, 6 p.m. 'The chemist and the public health engineer in relation to water treatment and examination' by W. G. Carey.

WEDNESDAY 22 MAY

SCI (Food Group)—London: 14 Belgrave Square SW1, 6 p.m. Young members' meeting. 'Some chemical effects of the irradiation of food constituents' by Dr. B. Coleby; 'Aeration in marsh-mallows' by R. W. L. Goodwin; 'Determination of vanillin and ethyl vanillin in admixture by paper chromatography' by Mr. R. Born; 'A young chemist's dream of progress' by S. L. Kidman; 'Determination of carnosine and anserine in meat' by C. L. Davey; 'A modified method for the detection of pectinesterase in citrus juices' by S. Thompson.

XVIth International Congress of Chemistry in Paris

FORMS and inscription cards are now available and are being distributed. The organising committee requests that the cards should be returned by 31 May.

It is stated that this sixteenth meeting of the International Congress of Chemistry (Paris, 18-27 July) will be a large one. More than 900 scientific papers have been sent in by the authors, who represent 38 nations. These papers will be read according to the divisions of the different subjects previously mentioned. Seventeen main lectures are to be given in the three languages, English, German and French, by world famous scientists.

Centenary celebrations of the Société Chimique de France (16 to 18 July) will precede the Congress.

Further information can be obtained on application to the Secrétariat Général due XVIe Congrès de Chimie, 28 rue Saint-Dominique, Paris 7^e, France.

Market Reports

PRICE CUTS FOR WHITE AND RED LEAD

LONDON There has been a steady buying interest on the home market during the past week and a good movement of supplies against contracts. Overseas inquiries are keeping up pretty well. Price changes have been few but the undertone is strong for most industrial chemicals. Quotations for white lead and red lead have fluctuated with the price of the metal and as from 15 May the basis price for dry white lead is £134 5s per ton and for red lead £126 15s per ton.

Raw materials for the paint and plastics industries are in good request and there has been a steady call for citric and tartaric acids, hydrogen peroxide and formaldehyde. The demand for fertilisers is a little less active.

Business in the coal-tar products market has been fairly brisk and there has been a ready outlet for most items.

MANCHESTER A steady demand for textile bleaching, dyeing and finishing

chemicals has been reported on the Manchester market during the past week, and most other leading heavy products are finding a ready outlet in the home trade. In a number of instances, including the soda compounds, a satisfactory demand on overseas account is also reported. With an odd exception, prices continue on a firm basis. In the fertiliser trade one or two lines are being called for in fair quantities, but otherwise business shows signs of relapsing into between-seasons' quietness. Most of the light and heavy tar products are in steady demand.

GLASGOW Very little alteration has to be reported in the Scottish heavy chemical market. Prices on the whole were steady and trading generally was slightly quieter, especially towards the end of the week. There is, however, still considerable activity in regard to agricultural chemicals, particularly concerning demands against orders placed earlier in the season.

Draft ISO Standards for Aromatic Hydrocarbons

WORKING GROUPS have been set up by the International Organisation for Standardisation (ISO) to undertake collaborative work on some of the tests carried out by member-countries on analytical methods for benzenes and toluenes.

This action was taken at the ISO conference on aromatic hydrocarbons, held recently in London. Representatives came from Belgium, France, India, Italy, the Netherlands, Sweden and the USSR. Observers were present from Czechoslovakia, Turkey, the International Conference of Benzole Producers and from the ISO committee concerned with chemistry.

Principal criteria to form the basis of a draft ISO proposal for xylenes, with others on benzenes, toluenes, benzoles and toluoles, will go forward as soon as test methods have been settled.

Delegates also agreed on the need for a unified international terminology and a working group was set up to go into the subject.

Plastics Sheet, Tube and Fittings

INTRODUCTION of a new range of plastics products in the form of sheet, tube and fittings is announced by Prodorite Ltd., Wednesbury, Staffs.

A complete range of pipes 'T's, 'Y's, elbows, bends, branches etc., in six different plastics materials is now offered, completing the pattern of plastics materials at present commercially available anywhere in the world.

The products included in the range now announced are rigid p.v.c., nitrile rubber p.v.c., polythene of both high and low pressure types, nylon, styrene acrylonitrile and resin/glass laminates.

These pipes and fittings, if required, can either be supplied to users who wish to do their own installation, or else Proderite will carry out the work on the client's behalf.

Gifts to Oxford

GIFTS of £4,000 from Imperial Chemical Industries and the Shell Petroleum Co. were accepted by Oxford University for the department of engineering on 7 May. Mr. J. B. Butterworth, fellow of New College, said that the gifts would enable the department to increase its staff to take full advantage of the new accommodation which was being provided.

RFD Protective Clothing



Specially designed to give protection against red fuming nitric acid is this Terylene suit made by the RFD Company of Godalming, Surrey. Known as the 'Corporal Suit' it is worn by personnel firing the Corporal ground-to-ground guided missile. It is similar in design to suits made by RFD to give protection against high test peroxide (see CHEMICAL AGE, 10 November, p. 249)

TRADE NOTES

A new company, to be known as Klockner Moeller England Ltd., has been formed to market in the UK electrical control gear manufactured by Klockner Moeller, Bonn. The company at present has offices at 4 Queen Street, Mayfair, London W1 and Prince's Buildings, 28 Oxford Street, Manchester. New premises for the London Office are being arranged. The managing director is Mr. H. M. Passer.

Price Reductions

As a result of increasing production Sunvic Controls Ltd., 10 Essex Street, London WC2, have announced 'considerable' reductions in the prices of Nullmatic controllers, M/P control stations, pressure regulators, fast acting valve positioners and air filters.

Uclaf Plant in Full Production

Manufacture of cortisone and delta-cortisone is now in full production at the Stratford, London E15, factory of Uclaf Ltd.

New Telephone Number

Telephone number of Marchon Products Ltd., Whitehaven, Cumberland, is now Whitehaven 3131 (15 lines).

Corrosion-resisting Lacquer

Amber Oils, 11a Albemarle Street, London W1, has developed a corrosion-resisting lacquer for application to metal surfaces. The coating is claimed to be strongly resistant to scuffing and abrasion and to withstand heat and moisture. It is said to be suitable for protection of machine tool parts and for the protection of metal components while they are in transit to export markets.

Closures for Collapsible Tubes

In addition to the company's collection of plastics caps for collapsible tubes, Universal Metal Products Ltd., Langley Road, Salford 6, Lancs, now offer a range of conical caps. They can be supplied either with wads or with the patented UMP wadless closure. This latter range of caps is also available in polythene. All UMP polythene caps are provided with a buttress type thread combining safety and efficiency.

New Polythene Tubing

A high strength polythene tubing for cold water services, a new product by the Yorkshire Copper Works Ltd., Leeds, is being shown at the Birmingham Exchange and Engineering Centre. Normal gauge BS 1972 sizes of this piping are said to be as strong as ordinary polythene tubing in heavy gauge, having a tensile strength of approximately 3,600 p.s.i. compared with 1,400 p.s.i. for ordinary tubing of the same size.

Another new exhibit at the Centre is an inexpensive and speedy technique which produces epoxide resin moulds for use in the vacuum forming of thermoplastic sheet. This has been introduced by Bakelite Ltd.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents),' which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London WC2, price 2s 6d including postage; annual subscription £6 6d.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection on 12 June.

- Making continuous fibres of a heat-softenable material. Owens-corning Fibreglas Corp. **776 638**
 2-Methyl 1:3-cyclopentane-dione. Soc. Des Usines Chimiques Rhonepoulenc. **776 920**
 Electro-chemical detection of oxidising gases. [Divided out of 776 770.] Mine Safety Appliances Co. **776 771**
 Oxidation of aliphatic carboxylic acids to peracids. [Divided out of 776 757.] Du Pont de Nemours, E. I., and Co. **776 758**

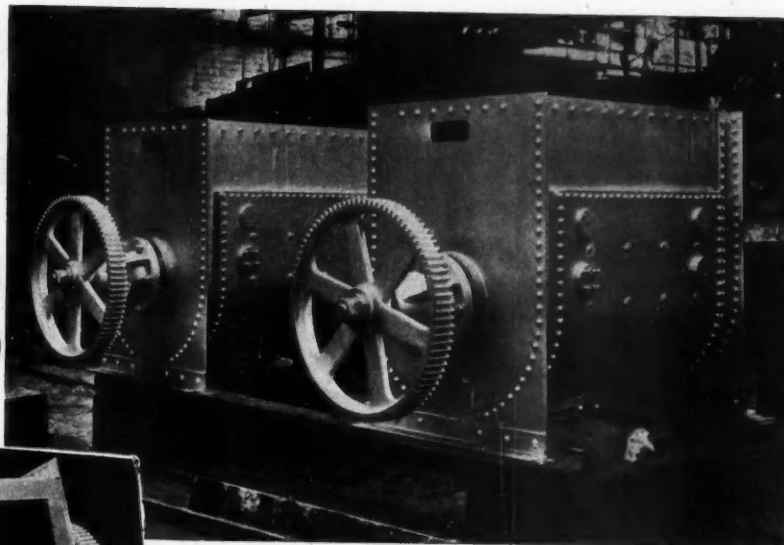
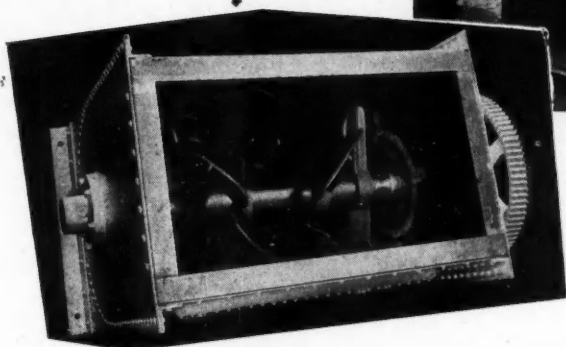
Open to public inspection on 26 June

- Process of continuously dehydrating muds containing recoverable minerals. Siebtechnik Ges. **777 561**
 Measurement and control of the relative humidity of gaseous atmospheres. Elliott Bros. (London) Ltd. **777 817**
 Mixed esters of a glycol and a glycol mono-urethane and processes for producing such mixed esters. Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St. Gobain, Chauny & Cirey. **777 696**
 Tanning process. Boeme Fettchemie Ges. **777 699**
 Thermo-hardenable adhesives. Siemens-Schuckertwerke AG. **777 563**
 Dispersing fogs and the like. Leda Chemicals Ltd., and Elton, G. A. H. **777 700**
 Organic compounds of aluminium. Ziegler, K. **777 701**
 Lowering viscosity of emulsions of polymers. Consortium fur Elektrochemische Industrie Ges. **777 447**
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Z4132/50/57/JT

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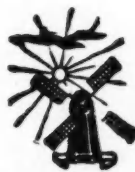
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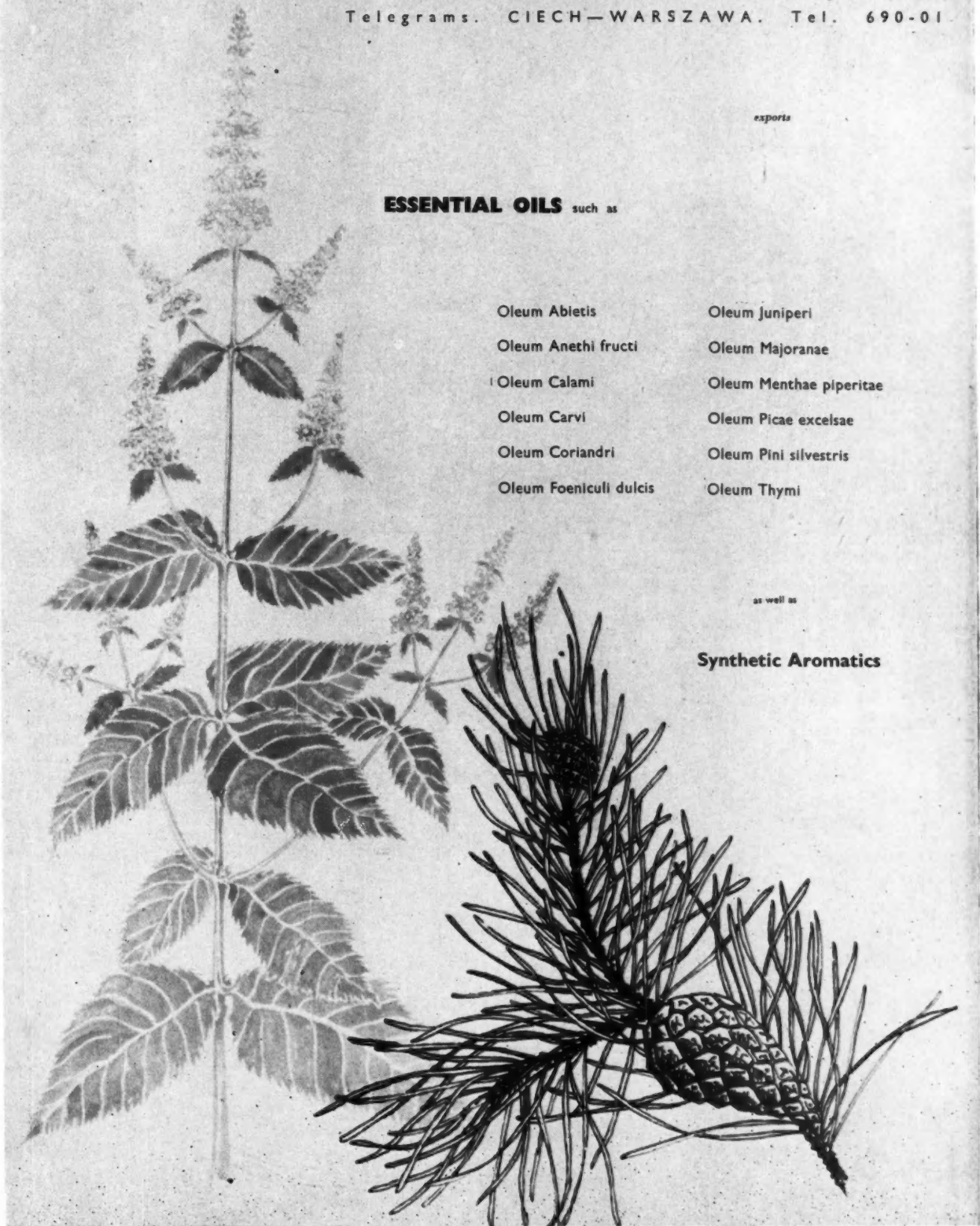
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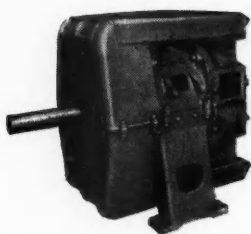
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